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Alternating Phase PDUs Make Load Balancing Simple

Server Technology's Patent-Pending Approach Balances Power On A Per-Outlet Basis

IS YOUR COMPANY DEPLOYING three-phase power? Although the technology is somewhat new to data centers, today's higher-density facilities have greater numbers of servers and other equipment that demand greater amounts of power.

Implementing three-phase power has its share of challenges. Chief among them is the need to balance each phase while accounting for a mixture of devices. The risks are high. When the load and current draw are balanced correctly, your data center will run with better efficiency and minimal heat issues. Balanced incorrectly, you can end up with overloaded branches, popped circuit breakers, or, worse, popped upstream breakers taking out an entire rack or more.

That's not to mention the fact that, in all those efforts to balance power at each branch, you can end up with a tangled mess in the back of a rack as you work to run a patchwork of cables and power cords to the PDU. That mess of cables results in poor cable management and impaired airflow.

Server Technology developed its patent-pending alternating phase power technology as a way to solve these challenges and others that its customers were running into when deploying three-phase power. The new technology builds on Server Technology's long history of PDU innovation stretching from developing the first intelligent PDU to the recent launching of its PDU Power Pivot.

Match Current Draw

Alternating phase power technology makes it simpler to deploy three-phase power and balance loads. Load balancing, or matching the current draw on each phase, is critical but often taken for granted, says Steve Hammond, product manager at Server Technology. "Lots of customers are not doing it correctly," he says, "which can pop a circuit breaker."

One of the main reasons is that equipment installers don't always really understand three-phase power technology and potential problems, Hammond says. "The principles of three-phase power are not always well understood by the installer, whose only task is to power up the equipment being installed in the computer rack," he says.



"When customers grasp the concept, they certainly see the advantages. Any customer who has overloaded a breaker because their phases were not balanced will appreciate it."

-Server Technology's Steve Hammond

In most data centers, racks are filled with a mixture of appliances and servers of various types and sizes. "If an installer can fit more appliances in a rack, then they'll certainly go ahead and do that," Hammond says.

Varies The Phases

Alternating phase technology varies the three incoming phases on a per-outlet basis instead of a per-branch basis. It does so through the use of a multilayer circuit board, Hammond says. Each phase is sandwiched between a board. "When we build the product, we make sure that the pins on the rear of the outlet interface with the

correct phase to properly alternate the power at each outlet," he says.

The alternating phase power technology is currently available in metered and Smart 400V three-phase PDUs from Server Technology. "This level of power is common in new data centers that want to take advantage of the high-density power provided by 400V," Hammond says. Future plans include building the technology into the company's 208V three-phase PDUs.

Server Technology metered PDUs include local LED input current monitoring so you can see the amps being drawn by network devices. Once you add or remove equipment, you'll immediately see the

impact on the cumulative current draw so you can get a visual confirmation that loads are balanced. Smart PDUs take that one step further by letting you take that information on current draw, trend it, and see what's happening over time.

PDUs with the alternating phase power technology include color-coded outlets, making it even easier for the installer to balance loads.

In addition to simplifying equipment setup and installation, using PDUs with the alternating phase power technology cleans up the back of the rack.

"Customers don't need to think about running the power cords to each branch to balance the load. They can now run the power cord to the closest corresponding outlet," he says. "Power cords can be shorter, improving airflow and allowing for a cleaner look," Hammond says. It also makes it much simpler to put more equipment into a rack and reduces the chances of overloading a single branch thus opening a breaker and taking down a branch.

See The Advantages

Response to the technology has been positive, with some of the first installations in the financial industry, Hammond says. In these initial installations, the greatest advantage has been for companies with large infrastructures that use third-party integrator firms to pre-wire the cabinets. "The wiring of the power cables from the servers gets much more simplified, thus it is easier to map out the cabling," he says.

Overall, the technology has the potential to simplify three-phase power installation for companies of virtually any size, in any industry.

"When customers grasp the concept, they certainly see the advantages," Hammond says. "Any customer who has overloaded a breaker because their phases were not balanced will appreciate it." ■



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FEATURED PRODUCT

Spot Potential Problems Before They Occur

Geist's Environet Offers Predictive DCIM Both IT & Facilities Can Use

How is your data center? Are your systems, applications, and other equipment running efficiently? Or could you be on the brink of disaster and not even know it?

Critical components of the data center need to be monitored and managed. Being able to see potential problems before they become catastrophic is essential. But if you're skeptical about the need to know the heartbeat of the systems you're in charge of—no matter what size data center you operate—consider the high cost of downtime. Even a small outage or other problem can cause big problems for your business.

That's where data center infrastructure management tools such as Geist Environet prove their worth.

Alarm, Report & Trend

"A good DCIM solution will allow the end user to collect real-time data that will alarm, report, and trend on important infrastructure," says Matt Lane, president of Geist DCiM. "It is key that they can do this without spending a large amount of time and effort."

What words best describe Environet, Geist's enterprise DCIM solution? "Customizable, cohesive, comprehensive, and cost-effective," Lane says. Perhaps most important, he says, "Environet goes beyond typical monitoring systems by



surpassing reactive or even proactive methods to provide the user with predictive toolsets, informing about potential problems before they become catastrophic."

See The Details

With Environet, you'll be able to graphically see the details of all mission-critical equipment, from an entire building complex to the smallest component within it. And the program isn't limited to just one location; it monitors all mission-critical components from anywhere, even if it's multiple locations around the globe.

Unlike other tools, Environet's modular platform lets you build as you grow. "Rather than use large capital resources up front, the customer can manage their budget more effectively and know that they aren't overspending on a system that is too large," Lane says. "We strive to build their system

to their needs and not ours."

Environet's drill-down capabilities let you track statuses of an enterprise, dive into an individual facility, or view a single point of information, Lane says. "Graphics, calculations, sequences, and

more can all be customized to fit each facility," he says. You can pick from Environet's feature list and build a system that meets your data center's unique needs.


Environet appeals to both IT and facilities groups, Lane says, because it gets all your critical equipment working together and under one interface for unified management. That's no small feat considering a typical data center has various types of assets and equipment, all using different protocols for communication.

Easy To Integrate

You can be sure the system will work efficiently with your existing equipment. Environet is easy to integrate into any facility with its support for a variety of manufacturers and multiple communication protocols, including SNMP, Modbus, BACnet, and LONworks. Plus, it works

with current building and network management systems.

Customers like Environet's industry-leading management features, Lane says. Those features rely on the real-time data Environet collects, letting you set alarms and alerts so you can be notified when trouble is starting with plenty of time to make corrections.

You can also use the real-time data to create custom dashboards showing key performance indicators for a one-screen look at the most important metrics. With Environet's ability to trend data over time, you can be sure you're making proactive, rather than reactive, decisions. 

Geist Environet

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A comprehensive DCIM tool that makes it easy to monitor your data center. Environet goes beyond typical reactive or proactive methods by providing predictive toolsets that can pinpoint potential problems before they become disasters.



COMPANY TO WATCH

Tackling Today's Air-Handling Challenges

Mestex Offers HVAC Innovations, Range Of Products For The Data Center Market

THERE'S A SEEMINGLY ENDLESS array of vendors providing solutions to help solve your data center cooling issues. How do you find a vendor you can trust? Industry experience is one of the best judges, and Mestex has no shortage of that.

"Our evaporative cooling product lines have been in existence for 66 years," says Mestex President Mike Kaler. "We pre-date our competitors by at least 15 years." Mestex uses that experience and knowledge of the industry to understand your unique data center cooling needs and provide the HVAC systems that will best match your needs and building type.

Unlike many cooling vendors, Mestex offers a complete line of data center

cooling products, including portable, direct evaporative, indirect evaporative, and packaged rooftop units.

Portable

The Koldwave products offered by Mestex are ideal for data centers in need of either permanent or semi-permanent cooling in server and telecommunications rooms, network closets, and any other area with cooling needs.

Koldwave products can provide between three-quarters ton and 5 tons of cooling and come in both water-cooled and air-cooled versions. A steel framework, stainless steel construction, and heavy-duty industrial casters make the units among the sturdiest in the industry. Color-coded connections simplify



installation, and digital controls with an optional IR remote control make management easy.

Direct Evaporative

The Alton Seasonal Make-Up Air Unit fea-

tures a direct evaporative cooling option that's one of the most efficient ways to cool, changing warm dry air into cool air and costing about one-fifth the cost of mechanical air conditioning.

Indirect Evaporative

An indirect evaporative cooling unit, such as that found in the Aztec system from Mestex, uses a cooling tower and chilled water coil integrated in the unit, an approach that simplifies installation and data center infrastructure requirements. You can configure the Aztec to combine indirect evaporative cooling and fresh air cooling for greater energy efficiency.

Evaporative cooling units have traditionally been beyond the price range


of what small to mid-sized enterprises can afford. But the Aztec units solve that by providing self-contained, rooftop-installable, "bite-sized" units pre-engineered and preconfigured with digital control and monitoring software. Plus, the Aztec works with and without underfloor constructions.

Beyond managing the unit's temperature and pressure control via up to five cold-aisle temperature and one cold-aisle pressure sensors per unit, the digital control system monitors operation and provides service notices, temperature trend recording, and optional GUIs accessible onsite or via Internet access.



Packaged Rooftop Units

More than six years of research and design went into building the Applied Air Fresh Air Package from Mestex. It's a dedicated outdoor air system that can also be used with return air off of the data center hot aisle.

While most similar units can handle air up to 90 degrees Fahrenheit, the Fresh Air Package has been certified for up to 115 degrees, offering greater flexibility for raising your cold aisle temperature. The included DDC controls are compatible with BACnet, LON, N2, and Modbus. 

Company Name: Mestex

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The U-X3 (pictured above) is an economical, but extremely flexible AC power control device that can be used to control the AC power to three different devices via Ethernet, USB or Wireless.

The products were developed as a result of specific user requirements, others as OEM products while still others evolved solely on speculation. This has resulted in a rather diverse product line and has also served to expand the company's technology base.

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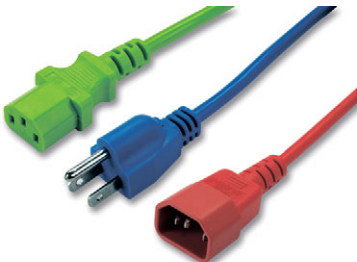
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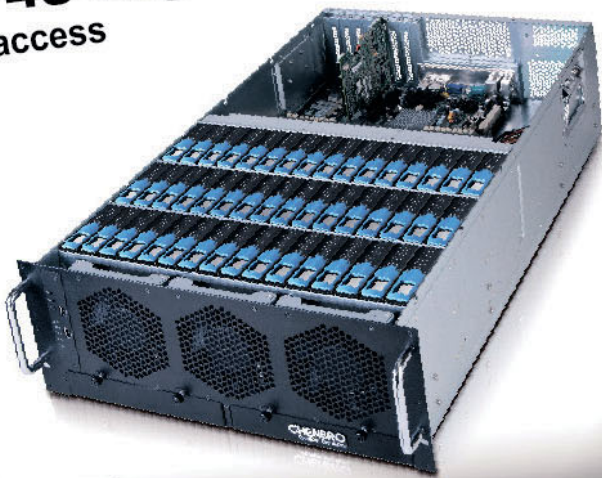


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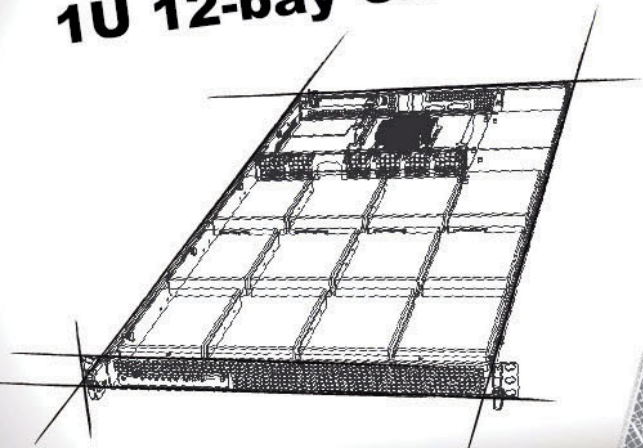
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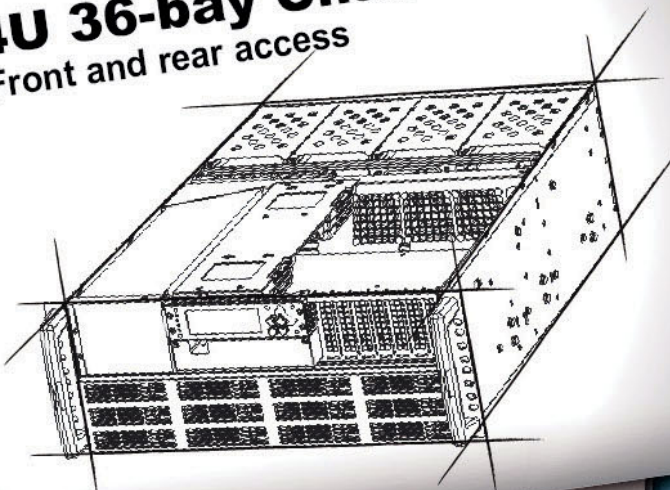


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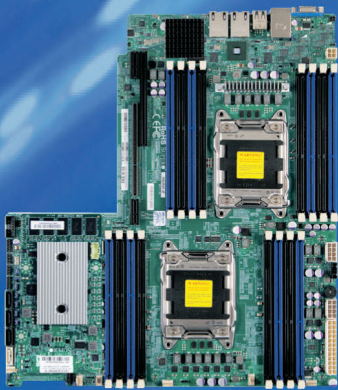
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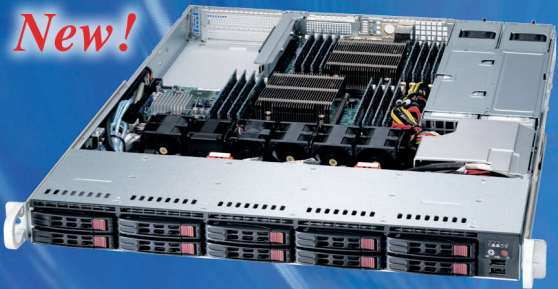
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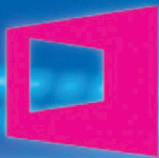
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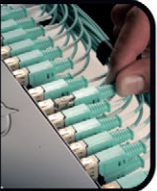
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Gartner: BYOD Strategies Bring “Radical Change” To Client Computing In Business

Creating new mobile workforce opportunities. Increasing employee satisfaction. Reducing or avoiding costs. Those are among the biggest benefits of BYOD, according to David Willis, vice president and distinguished analyst at Gartner. As enterprises recognize the benefits, they are working to establish BYOD programs and find the right strategy, bringing significant change to the industry. “BYOD strategies are the most radical change to the economics and the culture of client computing in business in decades,” Willis says.

According to Gartner:

By 2016, 38% of companies expect to stop providing devices to workers, instead opting for a BYOD program.

BYOD is most prevalent at midsized to large organizations with between 2,500 and 5,000 employees.

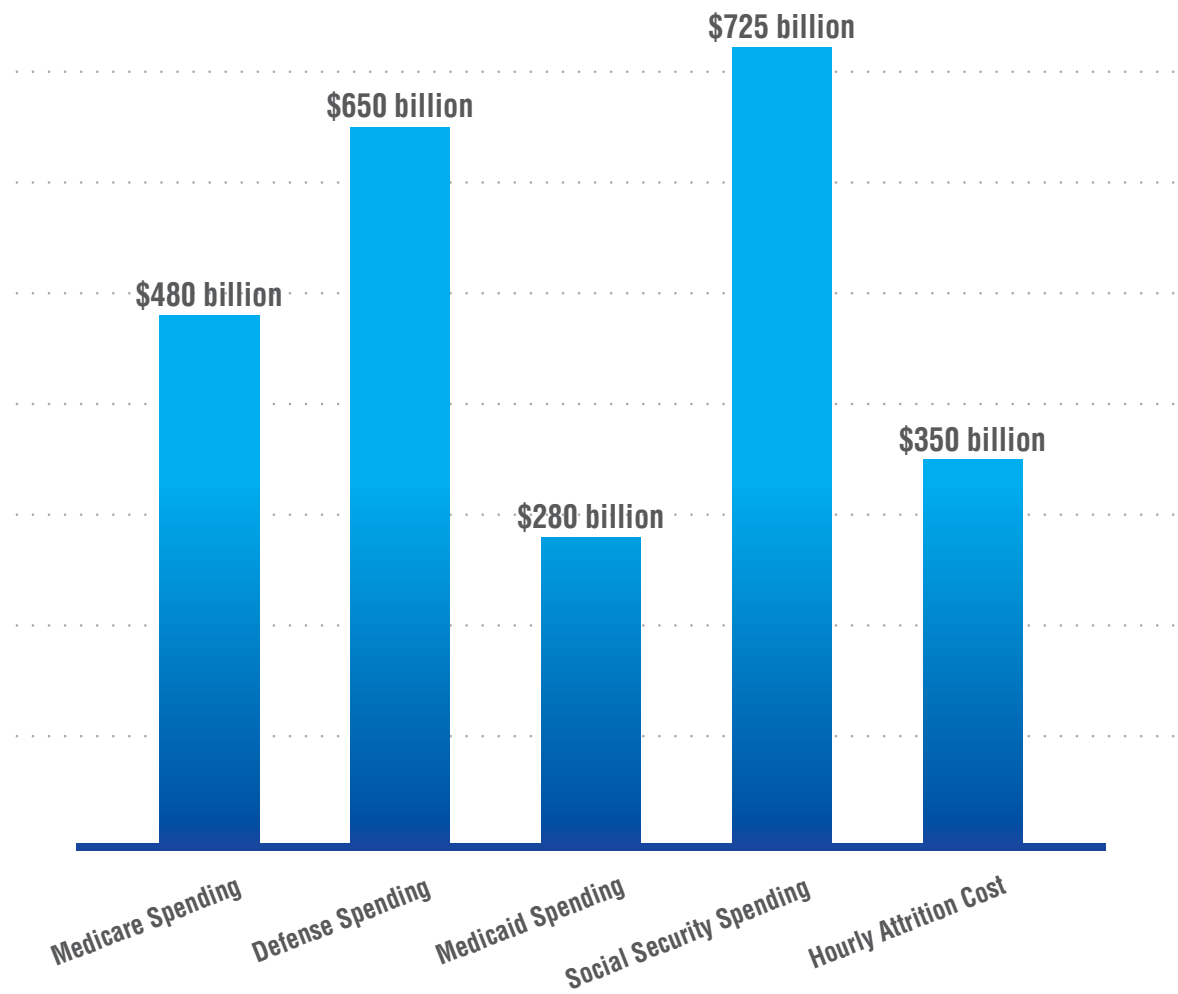
Only 22% of organization leaders believe they have made a strong business case for BYOD.

IT is confident in its security techniques, with more than half of organizations ranking themselves high in security of corporate data for enterprise-owned mobile devices.

United States companies are twice as likely as their European counterparts to allow BYOD.

Why You May Need A Chief Data Officer

If your company hires hourly workers, take note. According to Evolv, U.S. employers hire more than 100 million hourly workers each year and spend \$350 billion in attrition from that workforce (based on an estimated \$3,500 average cost per hire), so it’s in the best interest of organizations to pay close attention to employee retention. Big data, Evolv notes, is part of the answer, as there is about 360,000 petabytes of enterprise data created every year, half of which is human resources data; thus the company’s suggestion to hire a chief data officer. This chart illustrates the relative cost of attrition in various segments:



Touchscreen Manufacturers Hoping For Growth From Windows 8

Sales of notebooks with touchscreens are expected to grow from 3% last year to 12% this year, according to research from NPD DisplaySearch, with manufacturers hoping that the Windows 8 operating system will trigger the growth. Manufacturers have developed several new form factors, including flip and convertible, as a way to attract end users. “Touchscreen and PC manufacturers are looking carefully at how successful these initial Windows 8 touchscreen notebook models are in the market,” says Calvin Hsieh, research director at NPD DisplaySearch. Hsieh says that, with touchscreen functionality, device cost is proving more important than form factor.

Companies Increasingly Look To Cloud For Security Services

Enterprises are looking to cloud-based security as a way to quickly address a lack of staff or skills, reduce costs, or comply with security regulations, according to Eric Ahlm, research director at Gartner. By 2015, Gartner predicts, 10% of IT security enterprise product capabilities will be delivered in the cloud, and by 2016, the cloud-based security services market will reach \$4.2 billion. “This shift in buying behavior from the more traditional on-premises equipment toward cloud-based delivery models offers good opportunities for technology and service providers with cloud delivery capabilities, but those without such capabilities need to act quickly to adapt to this competitive threat,” Ahlm says. Email, tokenization (driven by compliance to PCI DSS), and security information and event management are the most popular cloud-based security services.

IDC: Amount Of Data To Continue Aggressive Growth

Spending on storage, infrastructure, and data organization platforms will experience significant growth through at least 2016, according to reports from IDC, as demand for big data technology and services escalates. The amount of data generated, processed, and stored by most organizations will continue to grow aggressively for the foreseeable future, with storage being one of the biggest areas of infrastructure spending for big data and analytics environments, says Ashish Nadkarni, IDC research director for storage systems. When it comes to storage, capacity growth and application performance are the top challenges organizations face. Performance is the primary driver when evaluating storage architectures, followed by cost.



Gigahertz-Speed Hard Drives? Try Terahertz

Hard drives rely on longstanding magnetic memory read/write techniques to store and retrieve data. But imagine optic laser pulses switching the 1s and 0s that make up binary data faster than a quadrillionth of a second at a time. That’s what researchers at the U.S. Department of Energy’s Ames Laboratory have been testing at Iowa State University and the University of Crete in Greece. The result would be a hard drive capable of terahertz speeds, or 1,000 times faster than today’s gigahertz speeds. Unfortunately, says Jigang Wang, a physicist involved in the research, “the speed of such thermal magnetic switching is limited by how long it takes to vibrate the atoms,” so it is difficult to exceed the gigahertz range at this stage. Now the search is on for new materials that can support the super-fast switching speed.

Competition In CRM Market Heats Up . . .

CRM software vendors pushed for greater market penetration internationally and more widespread adoption among small to mid-sized organizations last year, says Joanne Correia, vice president at Gartner. “Competition among CRM software vendors really heated up in 2012,” she says, with the top five CRM vendors accounting for about 50% of all CRM software revenue last year. CRM market growth was three times the average of all enterprise software, Gartner reports. SaaS accounted for about 40% of total CRM software revenue last year, as organizations looked for new installations, alternatives that were easier to deploy than their legacy systems, or new complementary functionality.

. . . & Number Of Related Apps Should Grow Considerably

Gartner expects immense growth in the number of CRM-related apps on the market. The research firm noted more than 200 titles available in mobile app stores in 2012 and expects

more than 1,200 titles to be available by 2014. “Customer experience management is emerging as a business discipline for marketing, sales, and customer service leaders,” says Ed Thompson, vice president and distinguished analyst with Gartner. “Every day, these leaders are incorporating more new technology into their projects to achieve their organizational goals.” Gartner projects the worldwide CRM software market, including both traditional software and cloud-based services, will grow 9.7% this year, with cloud services alone growing 18%.

Study Looks At Growth In Tablet Adoption

Adults between the ages of 25 and 34 are most likely to own a tablet, according to the latest quarterly tablet report from the Consumer Electronics Association. About 47% of adults in that age group currently own a tablet, up from 38% in December of last year. About 40% of online adults say they own a tablet, up 2% from December. 68% plan to purchase a tablet at some point—that’s down 6% from December, likely indicating that some of those purchases were made in the first quarter, CEA reports. Consumers are twice as likely to purchase a tablet with a medium-sized screen (between 8.9 and 10.1 inches) than a smaller screen of 7 to 8 inches.

Wireless Investments, Traffic Up

Wireless providers in the United States made significant investments in their networks last year, spending 19% more year over year to reach \$30.1 billion, according to CTIA-The Wireless Association. Those investments made up 25% of worldwide wireless capital expenditures, even though the United States has only 5% of the world’s wireless users, CTIA reports. U.S. wireless providers invested about \$94 per subscriber. In 2012, there were 1.468 trillion megabytes of wireless network data traffic, up 69.3% from 2011. Minutes of use were up just slightly from 2.295 trillion minutes in 2011 to 2.299 trillion minutes in 2012.



Smart Buildings Providing More Wireless Control

The proliferation of wireless networks has vastly increased the number and types of smart building system controls available to maintenance personnel and other users. Initially a wired affair, system controls have been able to take advantage of numerous advances in wireless networking, including new standards such as ZigBee, to provide enhanced remote management of such things as heating, cooling, and lighting. Watch for this trend to continue at a fast past according to a new report from Navigant Research, which forecasts that worldwide shipments of such controls for building automation systems will pass the 36 million mark by 2020.



Growth In IT Hiring Slows For Third Month

IT hiring continues to be sluggish, and there’s a strong chance that IT hiring won’t improve significantly for some time, says MV Janulaitis, the CEO of Janco Associates. In making the prediction, Janulaitis looked at the most recent data from the Bureau of Labor Statistics, which shows that there were only 4,600 jobs created for IT professionals in April, which is down from 11,700 created in January. “If you look at the stock market, you would think that everything is great. However, there is concern that the pace of the recovery is too slow to generate sufficient demand for new technology and systems which would result in more IT pros being hired,” Janulaitis says. A recent Janco Associates survey of 98 North American CIOs shows that less than 10% of CIOs are looking to expand the size of their IT departments.

SIX QUICK TIPS

Protect Against Advanced Persistent Threats

Tips To Proactively Combat Slow, Methodical Cyberattacks

ADVANCED PERSISTENT THREATS, or APTs, are a unique breed of security risk in the sense that attackers aren't necessarily after the quick payoff. They're generally prepared to engage in a long-term process to acquire confidential data and intellectual property.

APT attacks are commonly described as slow developing but potentially long lasting and are well funded, organized, and planned. What APTs aren't, however, is new. But many enterprises aren't as familiar or ready to deal with APTs as they should be. The following provides tips for doing so.

✓ *Know The Sophistication*

APT's differ from other malware in that they generally aren't used to return a quick

financial gain, and the attacks tend to have plenty of resources behind them.

Michela Menting, senior analyst at ABI Research, says the sophistication of enterprise-aimed attacks has increased in recent years with the sophistication generally falling into three malware levels. The lowest tier doesn't target anyone in particular, she says, and security companies have generally analyzed and categorized ransomware, fake anti-virus products, and other types in this group.

The second level is more developed, often part of a package, typically available via underground markets, and can be tailored at specific targets, she says. Examples include remote access Trojans (RATs) used to gain unauthorized administrative access to a target computer and

exploit kits that facilitate delivery of malicious payloads. Menting says tools such as the Zeus Trojan and corresponding botnet and backdoors such as Poison Ivy belong to this group.

The top-tier group is the most sophisticated and includes "high-end exploit kits, such as BlackHole, and custom-made malware like Stuxnet," she says. This malware type is often targeted and used in combination with social engineering techniques, unique code, and zero-day exploits, she says. Stuxnet-like malware, for example, appears backed by nation-states, giving creators access to more resources than organized crime does, meaning their "development and deployment aren't necessarily constrained by financial requirements."

✓ *Understand The Lifecycles*

Derek Brink, vice president and research fellow at Aberdeen Group, says that, in many ways, addressing APTs "is a battle of two lifecycles."

Simply put, a typical attack lifecycle involves attackers identifying vulnerabilities through reconnaissance of an organization's IT networks and systems, implementing and executing exploits to selected vulnerabilities, (possibly) automating exploits to run at scale, and then staying a step ahead of defenses. As attacks become more sophisticated, he says, attack lifecycles are "being designed with imperceptibility in mind, and they may be carried out over a period of weeks, months, or even years."



From an organization’s perspective, Brink says, an incident response lifecycle includes in simple terms identifying irregular behavior possibly signaling an attack; assessing, containing, and remedying the incident; and restoring IT infrastructure to a pre-incident state (presumably while also implementing preventive measures).

Worst case, he says, an organization identifies all anomalous behavior only after exploits are running at full scale. Best case, it identifies all irregular behavior at the beginning of the attack lifecycle. Ultimately, detecting attacks upstream results in lower total cost of security where investments and “costs not avoided” are concerned, he says.

In a recent study, Brink found more security leaders reported no successful exploits

occurring in the past 12 months, leaders more successfully pushed incident-related costs to the “avoided” vs. “not avoided” side, and leaders allocated a greater proportion of the total annual security budget to prevention rather than detection and response.

✓ *Shore Up Defenses*

In many cases, Menting says, breaches and data theft occur over a long time and the damage is significant. She says 94% of companies investigated learned about a breach from external sources, typically law enforcement or press releases from hacktivist groups. In fact, an average of 416 days elapse before large enterprises discover a breach, she says. Most companies are generally unaware of threats and don’t fully understand

the value of data, she says. “Security beyond simple antivirus solutions and a firewall isn’t seen as a necessary requirement. IT personnel are limited by budget requirements, and management usually understands the security issue even less.”

Many organizations are hesitant to invest in preventing threats such as APTs that may or may not occur. Usually, enterprises only start reassessing security strategies after a breach, Menting says. Implementing adequate security policies and products requires involving people with specialist skills, experience, and knowledge.

“One single solution cannot solve all problems. The issue requires a combination of different hardware, software, and personnel,” she says. “This requires long-term planning;

training and education; spending; and, critically, a change in business practices.”

✓ *Get Proactive*

Brink says the detection and response abilities that form the foundation of APT incident response are evolving rapidly. Aberdeen Group research indicates a shift from reactive (responding to and recovering from attacks already executed) to proactive (monitoring to detect and contain attacks early) approaches is rapidly underway.

Common detection means are proactive and include vulnerability scanning, penetration testing, and 24x7 security monitoring. Less common and generally reactive means include audits, employees discovering attacks, and periodic management reviews. [P](#)

✓ *Get Offensive*

ABI Research senior analyst Michela Menting says organizations are seeing more importance in deploying IDS, IPS, SIEM, and UTM systems to minimize losses stemming from security breaches and adhering to proactively protecting systems and data to ensure regulatory compliance. This encompasses an increasing market in services that include computer emergency response team/computer security incident response team (CERT/CSIRT) training, systems testing, and security assessments and audits.

“This is slowly leading to an emerging market in intelligence gathering and offensive security,” Menting says. “Such services can be simply tracking and tracing the origins of attacks to cut off the IP address block where the command and control server is or going deeper into counter-espionage in underground forums and chat rooms.”

✓ *Act Quickly*

Derek Brink, vice president and research fellow at Aberdeen Group, says if companies are essentially making things up on-the-fly in the wake of actual breaches, they clearly won’t be as successful as those having planned and prepared ahead of time.

Fast assessment, containment, remediation, and recovery requires developing strategies to contain problems (segmenting the network to separate affected resources from non-affected resources), pinpoint where to obtain information (log files) and when anomalous behavior is discovered, make business decisions based on trade-offs and risks, develop and enumerate a range of options as the basis for business decisions, process how to call in third-party incident response teams if an incident exceeds the enterprise’s capabilities, and enact an escalation plan based on the incident’s severity.

BONUS TIPS:

✓ *Recognize The Target*

Large enterprises, says ABI Research senior analyst Michela Menting, are the ideal APT target because they’re typically successful, make a lot of money, and have a lot of data attackers can commoditize on the black market. Additionally, the larger the organization, generally the more attack vectors present. But smaller enterprises are also at risk. Though some might see these companies as having nothing worth stealing, she says, their defenses are weaker, “making them good practice targets for novice hackers and script kiddies.”

✓ *Stay Current*

Aberdeen Group Vice President and Research Fellow Derek Brink says instead of technology-oriented responses, much of dealing with APTs “has to do with proper upfront preparation on the ‘people and process’ side.” Examples include having an incident tracking system, performing incident classification and handling, staying current on the latest attacks and techniques and which enterprise resources are the most critical, and formulating response strategies for a range of scenarios.

Evaluate Renewable Power & Energy Sources

Steps To Determine Which Sources Are A Best Fit

RENEWABLE POWER AND ENERGY usage in data centers isn't exactly new. In fact, there's considerable pressure on large enterprises now to adopt solar, wind, hydro, geothermal, and other renewables for their data centers. Although larger enterprises generally have the scale and clout to do so, small to mid-sized enterprises usually don't. That doesn't mean there aren't options still available, though. The following details such options and considerations to keep in mind.

Confront Feasibility Concerns

A common question among data center managers is if it's even feasible to use renewable power and energy.

"It's very clear there's more renewable energy on the grid today," says Stephen

Lacey, senior editor of Greentech Media. Much of the raw energy for data centers (hydro, geothermal, and biogas), he says, is pretty inexpensive and offers opportunities for some smaller players, though proximity to resources is key. "The dynamics are definitely different for the majority of data centers that are mid-scale or smaller," Lacey says.

Roger Tipley, board member of The Green Grid, says, though deregulation of the utility industry has made it straightforward to buy energy guaranteed to come from sustainable energy resources, attaining consistently available renewable energy on a regional grid varies by region and by season.

Anu Elizabeth Cherian, senior analyst at Frost & Sullivan, says renewables are

feasible for smaller enterprises if the "reliability factor increases from the current traditional technology employed."

However, the economics currently involved with using renewables don't necessarily provide an ROI worth the effort, she says. Deploying wind and solar projects, for example, is quite expensive. Wind projects include space considerations, construction costs, and issues associated with storing/using excess energy. Using solar energy in the Midwest or East Coast, meanwhile, requires succumbing to "uncertainties in winter," she says.

Draw Comparisons

Before buying renewable energy or creating projects, Lacey says, determine how your

Key Points

- Large-scale renewable energy projects are generally too expensive for small to mid-sized enterprises, but many feasible options still exist.
- Location plays a major role in what renewable energy sources make the most sense for enterprises.
- Numerous utilities provide incentives to enterprises for using renewable energy.

data center currently uses energy. Efficiency is the first thing to address, he says, as better efficiency can reduce onsite energy demands and reduce the need to use renewable energy.



Using smart controls integrated into building management centers and wireless control mechanisms, for example, can produce significant cooling savings, he says.

Lacey says enterprises must also determine which renewables are a best fit. “Everyone focuses on wind and solar, but that’s not necessarily going to be your best bet,” he says. For example, fuel cells, bio-gas, or waste-to-energy options could provide good opportunities, he says.

Check into procurement opportunities that utilities offer, including programs directed at different industries and sectors. Doing so can deliver contracts for renewable energy that account for 25, 50, or 100% of a data center’s overall energy, he says. More utilities are offering “opportunities to figure out what’s

happening in the utility territory you’re operating in,” he says.

Weigh The Factors

Cherian says cost is the biggest factor for enterprises to weigh. Without incentives to make renewables more attractive, she says, prices aren’t likely to come down in the next five years. Further, unfamiliarity, uptime needs, and eliminating single points of failure during power outages will mean enterprises will continue using traditional power sources in tandem with renewables. Other factors include “bulky” setups of some renewables and uncertainties about continuous supply availability. Overall, the ability to make “full swing conversions” may not be there, she says.

Location is another factor impacting renewables, Lacey says. The Southwest and West, for example, offer good solar resources, the Pacific Northwest and Midwest good wind options, and the Pacific Northwest more hydro options. The Northeast is a bit of a mix, and the Southeast has generally more biomass and waste-to-energy facilities. “Renewables are so geographic-specific,” he says. “You’re going to have to survey what makes the most economic sense. It’s pretty easy to figure where the market is pulling, where the resources are best, or where the companies in the renewable space are operating.”

Tipley says another issue is that measuring power usage at its source, whether renewable or conventional, becomes more

difficult. The Green Grid’s PUE metric was developed to measure how much energy is wasted, not if energy is green or brown, he says.

Data center hardware doesn’t discern energy sources. The Green Grid provides enhanced metrics to guide the eco-choices data center operators make, he says, and these metrics have economic and ecological ramifications.

“Naturally, most data centers make decisions based on bottom-line considerations, and the top three mandates of a data center are availability, reliability, and uptime. Thus, design and location decisions are often made so that both economic and ecological impacts are in alignment,” Tipley says. [P](#)

Top Tips

- ✓ Consider joining The Green Grid's Sustainable Computing Initiative (SCI), a program that enables companies to commit to procuring energy-efficient computing and networking equipment and using power-management features in that equipment where possible.
- ✓ Greentech Media Senior Editor Stephen Lacey says although the regulatory environment currently is “somewhat frozen,” most people believe there will eventually be greater control of greenhouse emissions. The sooner companies begin thinking progressively about how to procure energy and reduce onsite emissions, the better off they’ll be strategically.
- ✓ Lacey says to begin thinking about micro-grids, which enable combining various renewable energy technologies to create your own isolated grid if reliability problems occur on the bigger grid. In coming years, micro-grids will become more sophisticated and common.



Action Plan

- Determine how the data center is currently using energy.
- Pinpoint those places where power efficiency improvements are possible.
- Use available metrics to measure and track usage effectiveness and progress.
- Weigh cost, ROI, location, and other factors related to using renewable resources.
- Explore procurement, coupon, and voucher options that local utilities may provide.

Get Started

Roger Tipley, board member of The Green Grid, says enterprises considering using renewable power sources should first understand the possibilities provided by their locations. For example, The Green Grid offers free air cooling maps and calculators to help understand possibilities for air-side and water-side economizers.

“Step two is doing the math concerning possible renewable energy investments and their ROI, making sure to include the impact on the company’s brand value that the greenness of company operations can affect,” he says. The Green Grid also provides PUE, CUE, and WUE metrics that can help businesses move toward eco-effective operations.

SIX QUICK TIPS

Know Your Options For Managed IT Services

Focus On Vendor Selection, Available Services & Flexibility

AS YOUR DATA CENTER continues to grow, you may notice that time and resources are starting to shrink. It's difficult to keep up with technology trends and manage each and every system in the data center while also maintaining a respectable budget.

To ease the burden on IT departments and save money in the process, many companies are looking to managed IT services as a way to outsource infrastructure systems while maintaining the same level of performance. If you are considering investing in managed IT services, you'll need to compare multiple vendors, decide what types of services you should outsource, and always keep an eye on the future in terms of flexibility and technological innovation.

✓ What To Look For In A Provider

When getting started with managed IT services, you need to have a solid understanding of what you should expect from providers and how to find the best vendor for your needs.

Jenna Maertz, a consulting analyst at Info-Tech Research Group, says that, for starters, providers should offer a range of services to support both your current and future needs. She recommends that you sort through a provider's available services and choose one of your IT operations to start with. If you feel comfortable after the initial pilot phase, you can move on to adding more services. A service provider should be understanding of this process and let you "test the waters" first.

It's important to know what types of technology a particular vendor uses and ensure that technology complements your business needs and operations, but it's also equally important to seek out the certification of third-party support team members. "If your IT department is loyal to one brand in particular, ensure that the provider has certified personnel on staff," Maertz says. "You want someone with expertise, not tech support that they are learning on-the-fly."

In addition, you should set up a fair service-level agreement that holds the vendor accountable for failures, Maertz says. Find a vendor that is open to communication. "Appropriate communication with the vendor will ensure you do not have to seek financial penalties for non-performance."

You also need to find a vendor with a future road map that can help you create a long-term plan for your company and keep you aware of potential innovations that may emerge in the future. "Many vendors have on-staff consultants that will work with the customers to come up with the best plan and services mix for your organization moving forward," Maertz says.

✓ Know The Services Available

Once you have a good idea of what you require from a provider, you should start to look at what options you have in managed IT services. "These days, nearly all IT services can be outsourced to third-party vendors," Maertz says. "As outsourcing becomes more popular, providers are



offering services to allow IT to outsource more and more of its operations. IT managed services can include, but are not limited to, databases, applications, data recovery and backup, monitoring, storage, help desk, network, and security.”

The key to choosing the right operations to outsource is implementing risk aversion tactics while also paying attention to costs. For example, you may want to continue managing the storage of sensitive information onsite but use a third-party vendor for data recovery and backup management of other systems. Or you may want to move some applications over to a managed IT services provider while keeping security monitoring and management onsite so that you have total control over those systems.

✓ *Outsourcing IT Infrastructure*

With so many options for managed IT services, it’s now possible to move even the most fundamental management responsibilities to third-party vendors.

According to “Market Overview: Managed Service Providers, Part 1,” a report written by Forrester Research analyst Jonathan Silber, IT infrastructure is “the most mature technology area that MSPs cover.” There are a variety of vendors that support servers, wireless networking, desktops, networking solutions, and storage, and those services are mature enough that you can expect a high level of performance similar to what you already have with your internal infrastructure.

Silber’s report also points out that many MSPs in the IT infrastructure space are now moving into the mobile device space because of the growing popularity of bring your own device policies. Because of that, you can also expect to start seeing remote monitoring and management solutions designed specifically for mobile devices that are both inside and outside of the office.

✓ *Determine What Services Are A Fit For Your Company*

Just because you can essentially move all of your infrastructure management over to a managed IT services provider doesn’t necessarily mean you should. Instead of simply moving management functions blindly because they could save money,

you need to examine any areas where you could see improvement through outsourcing certain commodities. If you use managed IT services to overcome weaknesses or help your IT employees save time and resources, then you’re on the right track.

“When determining which types of managed IT services to utilize, take a careful look at your IT department,” Maertz says. “If your lack of expertise is leading to lost functionality and potential downtime, it may be time to consider outsourcing. Look for areas where your costs are high and could be lowered by using an external provider. Not all outsourcing will save the organization money, though, so carefully model out the six-year TCO to see whether you will actually financially benefit.” [P](#)

✓ *Be Aware Of Provider Longevity*

According to Jonathan Silber, analyst at Forrester Research, and his “Market Overview: Managed Service Providers, Part 1” report, there has been a lot of consolidation in the managed service provider space, and Silber doesn’t expect that to slow down any time soon. In fact, Silber says there could be “a shakeout of more than one-sixth of the MSP ecosystem by 2017 due to a combination of market forces.” This statistic shows why it is so important to find a reliable provider now; one with longevity, room to grow and expand, and a clear vision for where they will be in the future.

✓ *Search Out Flexible Providers*

When looking for an IT service provider, find one that is flexible and can grow alongside your company rather than hold you back with subpar performance. “Changing vendors is a lengthy and expensive process, and the flexibility of managed services varies greatly by vendor,” says Jenna Maertz, research analyst at Info-Tech Research Group. “Vendors will generally be flexible when it comes to upgrading, improving performance, and making simple changes, but they are often less flexible when it comes to downsizing and decreasing services. Take into account your current and future facility and service requirements and choose a vendor that can offer both.”

BONUS TIPS:

✓ *Take Your Time*

When it comes to making large-scale operational changes or signing a long-term service agreement with a vendor, it pays to research all of your available options and take your time making a decision. “Organizations that solicit vendors using a request of proposal process are more likely to experience success,” says Jenna Maertz, consulting analyst at Info-Tech Research Group. “Taking a minimum of three months to plan and conduct due diligence is suggested.”

✓ *Establish A Performance Baseline*

Maertz recommends that companies put a monitoring system in place for their in-house infrastructure to get a performance baseline. Using this information, you’ll be able to compare it to your outsourcing partner and determine whether you are getting what you pay for. You can also use this baseline when comparing vendors to ensure that you receive the level of performance your operations require.

Understand Network Traffic & Pinpoint Performance Issues

Monitoring Solutions & User Feedback Can Help

WITH THE INCREASING SPEED and performance demands of applications, employees, and end users, enterprise networks are more burdened than ever before. The constant flow of traffic can result in data bottlenecks, performance issues, or, worse, complete outages.

It can be difficult for IT managers to keep track of the network traffic or even fully understand why problems are occurring. That's why it takes a layered approach of speaking to employees and end users, implementing network monitoring systems, and using data to make informed decisions. It could be that your network issues require nothing more than a simple software or policy adjustment, or you may find your network is due for an overhaul. But either way, it's more

important than ever to have improved visibility and hone in on problem areas in your network.

Be Aware Of Network Performance Issues

One of the fastest and easiest ways to discover problems on your network doesn't require you to use software or any other type of solution. Your employees and end users will certainly let you know if they are experiencing performance issues, which will be your first sign that there may be a significant problem. "If performance is slow or you're dropping a lot of packets, from the end user perspective, those are the things they'll call the help desk about," says Mark Tauschek, lead research analyst at Info-Tech Research Group.

Key Points

- Speak to employees to determine what types of network performance issues they are experiencing. This can include not being able to access an application, noticing latency issues when Web browsing, and other common problems.
- Use a network management system to monitor your network. Not only do these solutions give you a better overall view of your network, but they also help you proactively avoid performance issues.
- If your network regularly suffers from the same issues, it may be time for an upgrade. There are many ways to plan ahead to help you avoid running into similar issues in the future.

Tauschek says that many employees will complain about not being able to open an application or that voice calls are choppy or jittery. However, there may also be a situation where it's one specific user or a group of users that is overburdening the network at one time. For example, Tauschek says, "We know that every day at 12:30 everybody jumps on Facebook and YouTube and starts killing our network," or, "Mark over there is downloading a big file and



it’s consuming all of our 10 megabits.” These are common network issues that could be temporary nuisances or long-term problems. And in many cases, there’s only one way to monitor the traffic to determine whether the issue requires serious attention.

Implement A Network Management System

For data centers, the constant movement of data on the network requires something more than a simple status indicator that says whether the network is up and running. Network management systems not only give you an overview of your network as a whole, but they also let you dig beneath the layers to pinpoint where exactly the performance issue is.

Tauschek recommends that companies look for a network management system that “gives you some visibility into the performance, traffic patterns, and problem areas of your network.” Because networks are often complex, you have to constantly monitor them or you could end up rushing to react. “There’s an inclination to sort of say, ‘Put it in, it works, leave it alone, and forget about it,’” Tauschek says. “You don’t care about it until it doesn’t work, and then you really care about it. If you’re proactively monitoring your network, then you are in a much better position to be proactive.”


For companies that are just starting out, Tauschek says that there are lower-end, relatively inexpensive solutions that give some view into the health, behavior, and performance of your network. The key is

to put some sort of monitoring solution in place because it will not only help you spot problems that need your immediate attention, but it could also help you determine whether your network requires more extensive changes.

Know When It’s Time To Upgrade

If you’ve gathered testimonies from your employees and end users, implemented a network management system, and determined that your network simply can’t keep up with even regular usage, it may be time to add more capacity or completely overhaul your network. “There are many ways to optimize bandwidth usage, such as application of WAN optimization or other technologies, but they don’t help the data center network,” says Jonah Kowall, Gartner research director.

Kowall adds that networks are under quite a bit of pressure because of private cloud implementations, virtualization, and other projects. For those reasons, data centers may have no choice but to upgrade their networks to meet demand and handle the large amount of traffic.

“Most organizations today are running some level of 10Gb Ethernet, but many are investing in 40Gb or looking at 100Gb in the coming years,” Kowall says. “Monitoring the network and bandwidth can allow for capacity planning, but doing the proper type of monitoring and planning is the only way to really plan for an upgrade. Replacing the core network is very costly, so the move toward 10 and then off to 40 or 100 is something that should not be taken lightly.” 

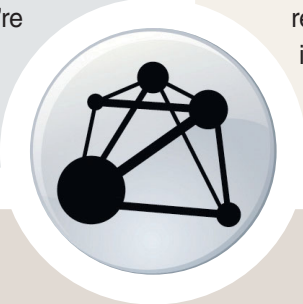
Top Tips

The following tips were provided by Mark Tauschek, lead research analyst at Info-Tech Research Group:

- ✓ Through the normal course of usage, when you hit 80% network capacity, you better start thinking about adding capacity or refreshing your network. And when you hit 90%, you should be in a position where it shouldn’t go much beyond that. If you’re pushing 95% or hitting 100%, then you’re going to have significant performance problems.
- ✓ Make use of the thresholds and alarms within your network management system. When you hit a threshold from one type of flow, user, switch, or port or whenever you hit a threshold that is indicative of misuse of the network or a problem in the network, you are alerted to it so you can come in and investigate it before it becomes a problem for users.
- ✓ Understand the linkages between the network that is in your control, the server infrastructure, and the public Internet that is perhaps outside your control, depending on how you’re structured. If you’re a pure network guy, you need to have some visibility into the end-to-end performance.

Action Plan

- If you don’t already have a network management system, consider investing in one that will give you a more in-depth view of the traffic and alert you to potential issues before they become major problems.
- Determine where network issues originate, whether it’s at the software and application level or if it’s a hardware-based problem.
- Figure out the best course of action to resolve network issues. You may find that the network struggles during peak hours and requires additional capacity, or you may discover that one user or department is taxing the network, which could lead to policy changes.
- Make sure to keep your monitoring solutions up to date and check your network status on a regular basis. If you spot emerging performance issues early on, it’ll be easier to address them and make the necessary changes.



Get Started

Implementing a network management system is a great place to start becoming more familiar with your network and its performance. Jonah Kowall, research director at Gartner, says that companies need to be able to monitor three data sources. The first data source is the network device, which is normally monitored via SNMP; the second is flow, which is generated by the network device and is a summarized data source of more detailed usage of the network; and the third data source is comprised of packets or raw data that is traversing your network, Kowall says. Monitoring packets is the best way to monitor your applications from a network perspective. Kowall recommends that companies use application-aware network performance management (AA-NPM) solutions because they provide “a deeper amount of visibility into application performance,” which can help you determine whether your network issues are happening at the application level.

Spot Data Center Inefficiencies

Advice For Detecting Wasteful Operations That Are Costing You Money

ONE OF A DATA CENTER and IT manager’s most important responsibilities is not only spotting data center operations that are running inefficiently but knowing the best ways to avoid them in the first place. This is particularly true where power and cooling are concerned. Here are tips and advice for spotting inefficiencies and resolving them.

✓ *Understand Common Inefficiencies & Why They Occur*

Data centers can be a hotbed of inefficiency. Ken Koty, sales engineer at PDU Cables (866/631-4238; www.pducables.com), says the most common inefficiencies include low power usage effectiveness (PUE); low power factor (anything less than 90%); failure to implement a hot aisle/cold aisle configuration on your raised floor; not using floor grommets in the raised floor cutouts, leading to a loss of static pressure in the underfloor cooling plenum; lack of

a good maintenance program for the entire cooling system; and using older, less efficient IT equipment in your data center.

Jeremy Swanner, executive vice president of sales at RLE Technologies (800/518-1519; www.rletech.com), says power and cooling are the largest culprits of inefficiencies. “And it is largely due to the fact people don’t know what or how to make adjustments.”

Cam Rogers, RLE’s vice president of domestic and international sales, agrees. “Too much of a good thing can be a power hog and get expensive. Not enough can result in equipment overheating and damage.” Rogers says addressing the hot spots can only be accomplished by identifying where they are, and to understand where they are, adequate temperature monitoring needs to be in place.

Swanner says that inefficiencies begin when you can’t identify a benchmark.

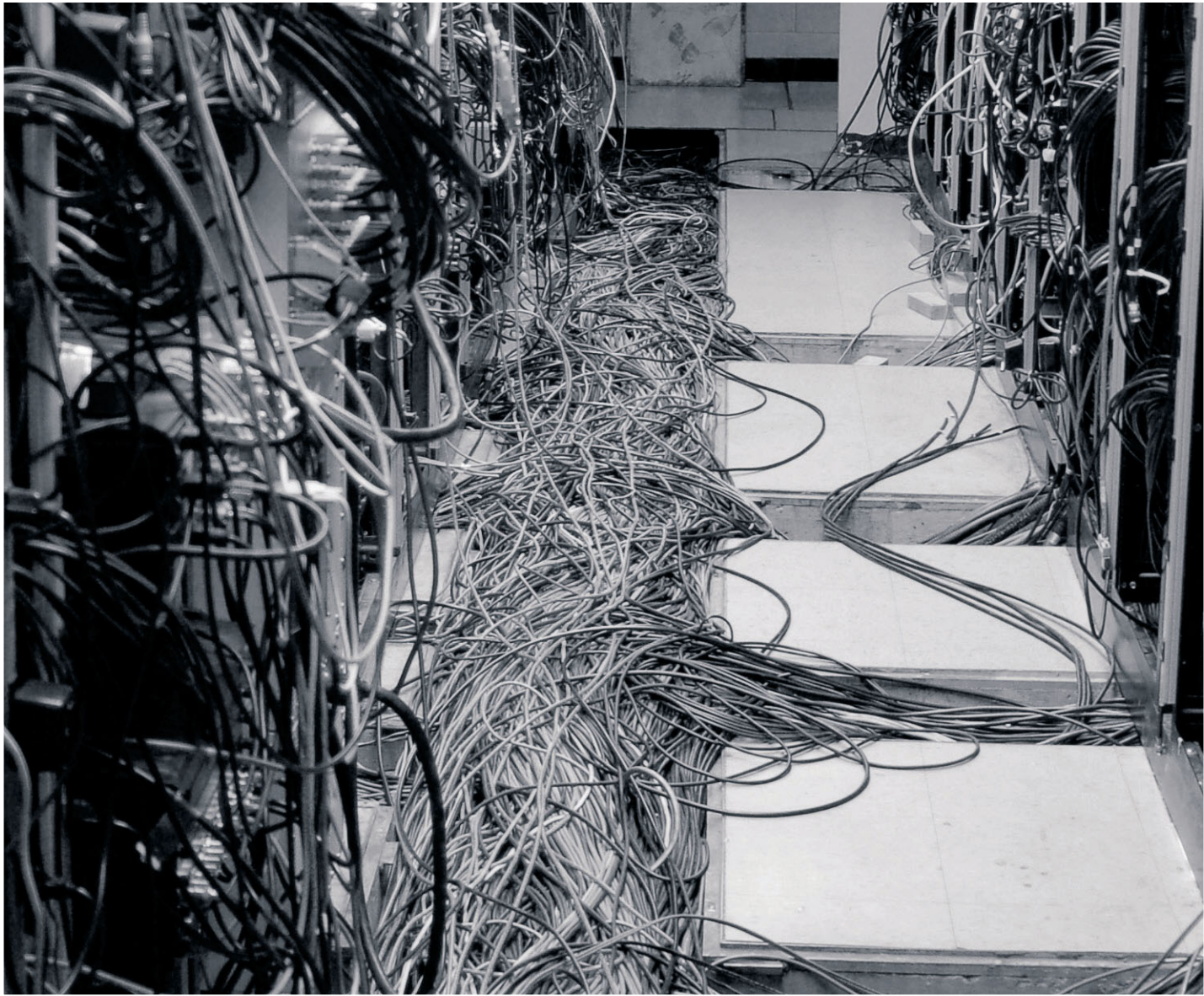
“You don’t know if you have inefficiencies until you have actionable data to determine where your baseline/benchmark is,” including information on power at the entry point of the data center, rack-based power, and CRAC unit power. “By gathering the data on power consumption, you can begin to build a proactive approach to identifying your inefficiencies,” he says.

Konkana Khaund, Frost & Sullivan environmental and building technologies industry manager, says inefficiencies also appear because there’s “no exclusive responsibility of DC management” in most small to midsize enterprises. A manager in charge of spotting inefficiencies might have several other functions, “unlike in large data centers where specialists are entrusted with data center management.” A multitasking data center operator often isn’t “acquainted with the emerging best practices in cooling, power, and infrastructure due to limited exposure and a smaller scale of

operation,” she says. “This, combined with the presence of typically older and less frequently overhauled equipment, renders SME data centers inefficient.”

Kris Domich, principal consultant of enterprise services and data center solutions at Dimension Data, notes other common reasons for inefficiencies, including equipment running at 110-120V even though it can support 208V. “There’s a measurable increase in amperage and heat generated when running at the lower voltage that results in the need for more cooling and can also result in a higher cost of power to run the device,” he says.

Domich also cites inefficient cooling or overcooling as a leading contributor. “If you’re overcooling the data center or have an inefficient physical design, cooling will cost more than it should,” he says. Data centers with a poor workload-to-physical device ratio—“in short, a lack



of virtualization,” Domich says—are also inefficient. He says many small to mid-sized enterprises have yet to virtualize enough of their environments.

✓ *Know Where You're Lacking*

Although managers may know of existing inefficiencies, they may not be able to rectify them for various reasons. These include a lack of capital allocated for essential backup power needs, incorrect sizing of power equipment, and an inability to ensure frequent maintenance checks, says Frost & Sullivan senior industry analyst Anu Elizabeth Cherian.

Domich says managers commonly are unable to act because of a reluctance to spend money to fix the problem due to the lack of a well-articulated business case. “Problems tend to take some sort of investment to solve, be that human or financial capital.” IT teams, he says, need to be

proactive in solving problems, which partially requires documenting a business case for the investment. “We need to become better at explaining the need for the investment in the proper terminology and showing how the investment represents a tangible benefit to the business,” he says.

✓ *Know The Successful Traits*

Enterprises that are doing a good job of spotting and resolving inefficiencies have several traits in common, including proactive thinkers, Domich says. They also understand how IT supports business functions, are willing to learn about new technologies, have managers comfortable articulating the business value of an IT solution, have enough staff to handle operations so they’re not always in “fire-fighting mode,” aren’t afraid of change, and have “mutually respectful relationships with IT and executive management.”

✓ *Seek Affordable Fixes*

PDU Cables’ Koty says there are several methods for spotting and resolving inefficiencies. For starters, know what your PUE is. “The best way is to take the total building power reading of your incoming utility meter, then measure and add all the power readings of each PDU/RPP and divide it into the total facility consumption.”

Koty says to walk through your raised-floor environment and make sure all cut-outs are being sealed by grommets. Also check if a maintenance system is in place for your cooling system and be sure all necessary tasks are being done on a regular basis and logged.

In addition, Koty says, meet with IT management and recommend newer equipment if you are using older, less efficient servers.

Domich says you should also consider virtualizing everything possible, using large

multisocket hardware or blades when it makes financial sense, and having a trusted partner conduct a power and cooling assessment to ensure the enterprise is using those assets to the best extent possible.

One other cost-efficient method is to minimize physical cabling to servers to enhance in-cabinet airflow. Easy-to-implement methods include installing basic monitoring and instrumentation throughout the data center to identify where problem areas exist and address those areas first, Domich says.

Hardware, software, and services to consider investing in include those that monitor temperatures within racks. Overall, Domich says, “when choosing a new IT platform or cooling system, invest in those that scale their performance based on load. This will result in lower energy usage during non-peak loads, which tend to be a majority of a given day.” P

✓ *Bring Facilities & Operations Together*

If you don't successfully bring facilities and data center operation staff together, some enterprises will experience an increase in management issues, legacy equipment, and surmounting virtualization needs that “continue to keep adding to already existing inefficiency issues,” says Konkana Khaund, Frost & Sullivan environmental and building technologies industry manager.

✓ *Focus On System Efficiency*

From a power standpoint, small to midsized enterprises typically are slow to invest in new equipment and maintenance, says Frost & Sullivan senior industry analyst Anu Elizabeth Cherian.

“However, a large part of the problem arises from the lack of focus on the total efficiency of the system as opposed to looking at efficiency from a single component standpoint,” she says. Thus, there may be a case in which greater efficiency is gained by acquiring the latest backup power modules and energy storage, but this “might be completely offset by the use of older generation servers and network equipment,” Cherian says.

BONUS TIPS:

✓ *Measure Your PUE*

Ken Koty, sales engineer at PDU Cables (866/631-4238; www.pducables.com), offers some guidance for measuring your PUE. The formula for PUE is TFP (total facility power usage) / IEP (IT equipment power), which is the energy that can be directly traced to the IT equipment consumption.

Here's a breakdown:

- 3.0 = very inefficient
- 2.5 = inefficient
- 2.0 = average
- 1.5 = efficient
- 1.2 = very efficient

✓ *Do Not Procrastinate*

Despite knowing that inefficient operations are detrimental to the enterprise's overall well-being, IT and data center managers may not rectify problems simply due to procrastination. “It is easy to succumb to the mindset of making changes at a later time,” says Frost & Sullivan senior industry analyst Anu Elizabeth Cherian.

Build Your Understanding Of Software-Defined Networking

Expect Better Speeds, Improved Efficiency & More Network Agility

SOFTWARE-DEFINED NETWORKING, or SDN, is a relatively new approach in the IT world. But in the next few years, it could become the go-to technology for data center networks.

Where today's networks are traditionally hardware-oriented and difficult to make changes to in many instances, SDN separates the control plane from the access plane and uses software to improve network performance and agility. There's plenty of promise for how it could reshape the data center network, with many vendors working to bring products to market.

While mainstream SDN implementation is still on the horizon, it's in your best interest to research the technology now and be prepared for the near future.

✓ *Understand What Software-Defined Networking Is*

When first learning about SDN, the best place to start is by understanding how it works. Andre Kindness, principal analyst at Forrester Research, compares SDN to an assembly line, where your hardware devices are people along the line. They all have their own brains, and you have to tell them individually what you want them to do. "It's very difficult to tell everyone what to do, send them policies one at a time, and train them one at a time," Kindness says. SDN addresses this by taking all of those independent brains and bringing them under centralized control to improve network efficiency.

Mark Tauschek, lead research analyst at Info-Tech Research Group, says that software-defined networking is really network virtualization. "In the same way that we abstract the intelligence and software from the actual hardware on the server side, that's what's happening with SDN on the network side." In essence, you are taking the intelligence out of the hardware layer and moving it to the software layer. This helps remove bottlenecks from the channel and therefore improve network speed and performance.

✓ *Costs Associated With SDN*

Because SDN is in its early stages, there are mostly open source options

available. "You move away from this proprietary, locked-in network infrastructure and architecture that we've been accustomed to and you go outside of that," Tauschek says. "What happens is that as it becomes open source, there isn't a cost associated with that part of it." But Tauschek warns that in the near future, vendors are "going to have to monetize it somehow," so don't expect free solutions to be the norm when SDN hits maturity.

Even though there will be costs associated with SDN in terms of software licensing and other upfront spending, Kindness says SDN will be a money-saver in the long-term because of improved efficiency and a faster overall



response time by “taking the human element out of the equation.”

✓ *Improve IT Efficiency With SDN*

“There is the promise that we can use much lower-cost hardware in some cases,” says Joe Skorupa, vice president and distinguished analyst at Gartner. But the biggest advantage will be in the responsiveness of your IT team. SDN frees up human resources by using automation to take care of potential problems in the data center.

“Rather than taking weeks to spin up a new application, you can now spin it up in minutes, so it’s more efficient and supports the needs of the business,”

Skorupa says. This leaves more time for your IT employees to work on other projects while knowing that the network itself is being taken care of.

Through the use of SDN, pushing out new policies is a less time-consuming process. “You can say that you need more capacity for this application because demand has peaked,” Tauschek says. “So automatically, you can say, ‘I’m going to spin up a new virtual machine and I’m going to load balance these things to add more capacity to the pool.’ From a network perspective, that all happens automatically at the same time that the virtual machines are being spun up, moved around, and with capacity being added as necessary.”

✓ *Prepare Ahead Of Time For Future Mainstream Solutions*

Kindness, Skorupa, and Tauschek all say we are still a year or more out from seeing mainstream SDN solutions readily available for data centers to implement. Skorupa sees late this year and into 2014 as the time when those will start to emerge and Tauschek agrees that 2014 will probably be the year. But Kindness says that he thinks the industry is “five years away from having mainstream solutions.”

However, that doesn’t mean that you shouldn’t start researching the technology now. All three recommend setting up test beds for SDN so you’ll be

prepared when vendors push their products to market.

“Some companies consider technology to be a key asset and are always on the leading edge,” Skorupa says. “For most companies, there are two things they need to be doing now. They need to be identifying people on their staff that have the right mindset to look at the network in a new way and to work cooperatively with people in servers and storage. They need to just start getting smart on it. Talk to your existing suppliers. Find out what they’re doing and what their plans are. Think about when it’s time to bring in some pilots. Get yourself familiar, begin the plan, and get things going.”

✓ *Solid Hardware Is Still Necessary*

It’s important to remember that even though software-defined networking has software in the name, that doesn’t mean your hardware won’t be just as important.

To get the most out of SDN, you’ll still need to invest in solid hardware that can support the network speed. “[SDN] doesn’t completely eliminate the hardware,” says Mark Tauschek, lead research analyst at Info-Tech Research Group. “You still have to have ports for traffic to pass through. If you’ve got multiple virtual machines running on blade chassis, you can now, through SDN, run that straight back to a core switch, but you still have to plug into a port somewhere.”

✓ *Consider Your Workforce*

Because SDN is such a new technology, it’s safe to assume that most companies won’t have an expert on staff, let alone someone who is certified to work with the technology.

“Your network administrators are not ready to do SDN,” says Andre Kindness, principal analyst at Forrester Research. “When you look at the vendor certification programs out there, most of them don’t have SDN built into their certification programs and no one out there today is learning it.” If you’re looking to get started with SDN and you simply aren’t prepared for it, Kindness says you should bring it in-house to test and that you may need to hire an SDN evangelist to help with implementation.

BONUS TIPS:

✓ *Opt For Flexibility*

Joe Skorupa, vice president and distinguished analyst at Gartner, says that companies should try to find a solution that is “more open and flexible” because it will “give you that greater degree of freedom to integrate multiple vendors’ solutions into your network.” But Skorupa warns that every SDN solution will have “some degree of lock-in,” so you shouldn’t expect fully customizable software.

✓ *Reach Out To Other Companies & Vendors*

The move from traditional networking to SDN won’t be easy, so you need to gather as much information as you can before taking the plunge. “This is a time when new technology comes out and new vendors will come up with innovative things,” Skorupa says. “You don’t want to be left on the sidelines.”

Because of this, Skorupa recommends speaking with a “new emerging company and at least one other established vendor, because people view it with different perspectives and approaches.”

SIX QUICK TIPS

Meet High Density Big Data Needs

High-Capacity Storage Solutions With Availability & Scalability Features Can Help Overcome Challenges

TO MEET BIG DATA CHALLENGES, you likely can't just add more drives to your existing servers and storage arrays. You have to seek out high-density storage solutions specifically built with big data in mind, and you have to make sure those solutions are scalable and reliable enough to support your present and future storage needs. Here's what to look for.

✓ *Cost & Performance Challenges*

High-density storage solutions designed to support big data can lead to cost and performance challenges that may not apply to traditional computing requirements. For instance, Tau Leng, vice president and general manager at Supermicro (408/503-8000; www.supermicro.com), says that big data situations and high-density solutions often

require remote commissioning automation, server and switch provisioning management, and a balance between consumption and the initial acquisition cost. In addition, high-density solutions often require external storage components, which can cause latency issues. Companies also have to be careful with big data because it can make balancing compute power, I/O bandwidth, and data capacity much more difficult, Leng says.

In addition to challenges for data centers, big data poses a challenge for storage manufacturers, says Wroe Chen, operating manager at Chenbro (909/947-3200; www.chenbro.com). "From the system builder or chassis manufacturer point of view, the challenge is that when you pack more hard drives with mechanical parts and spindles together, then

vibration is going to be a key issue." In the case of high-density solutions, that can mean you have 48, 60, or 72 drives running at the same time. Manufacturers must make "highly packed, high-density storage that can still meet the thermal and vibration needs," Chen says. Buyers should seek those specially designed products and make sure they're the right fit.

✓ *Storage Considerations*

To help overcome potential latency issues, Leng says to look for "complete solutions with server systems, storage, and network all in one, racked together and fully integrated to minimize any outbound traffic beyond the local rack."

To make sure you aren't packing too many drives into a single system or overpaying for

capacity that you may not use, Leng says to work "with vendors who can provide a broad selection of product configurations utilizing a building-block approach." This means that you can build an entire solution out of a selection of smaller parts to make sure the system works together as efficiently as possible. The building-block approach also makes it easier to expand in the future or downsize if you're having issues with overheating or vibration.

It's crucial to consider thermal issues, Chen says, because it can result in cost savings. He says that data centers need to find vendors experienced in building high-density platforms and understand that these systems can also give companies secondary benefits if designed correctly. "From the data center point of view, they want more drives but not



to degrade their performance or have thermal issues,” Chen says. “The best way to do that is to raise their operating temperature, so they can save on air-conditioning costs.”

✔ *Use Software To Better Manage Your Data*

Although hardware is necessary to overcome high-density challenges, software must also be a part of the equation. Some storage vendors will design their hardware with specific software solutions in mind. “Hadoop and OS distributions are readily available,” Leng says. “Deploying systems built with common hardware components for chipsets, storage, and networking ease deployments as drivers are already built into OS releases. IPMI interfaces to provide out-of-band

management are also provided as a good data center operations practice.”

To help ensure you can use all the data you’ve accumulated, Leng says some equipment suppliers will offer “complete life cycle management,” which means they “focus on software solutions and management covering data creation and mining data for insights, retention, and retirement.” Having software to handle data retention and retirement is crucial, because in order to be truly efficient with storage, you have to know what to keep and what to delete.


Monitoring is also important with big data. You need to find software solutions designed specifically for high-density systems that “enable system administrators to monitor and receive timely notifications

related to server health, manage availability of clusters in a given power envelope, and provide multiple ways to upgrade firmware that will shorten maintenance times during server upgrades,” Leng says. Not all manufacturers offer these types of software solutions with the products they make, so you may need to seek out third-party vendors for the functionality you need.

✔ *Look For Flexibility, Scalability*

Plan ahead for the future and opt for storage solutions that can grow alongside your company. Leng says that while performance is key, buyers also need to be prepared for the weight of the racks. He says that as companies continue to add, for instance, 1U 12-drive nodes, “the physical

weight may be challenging for data centers.” That’s why he recommends companies work with vendors who provide 1U, 2U, 3U, and 4U rackmounts that can help consolidate drives into smaller racks and help overcome these unforeseen issues.

Because scalability is essential for future planning, Chen says your chosen vendor should have a plan for providing even higher-density solutions than those it already offers. For instance, if a company has a 48-drive system, make sure it’s possible to add on to that with something like a 60- or 72-drive JBOD. It’s difficult to figure out exactly how much data you’ll need to store in the long term, so you need to make sure solutions can be easily scaled out and can be used to bring up the total capacity when you need it, Chen says. 

✔ *Make Sure Your Vendor Supports Customization*

“Customization really depends on the special requirements of the customer,” says Wroe Chen, operations manager at Chenbro (909/947-3200; www.chenbro.com), but manufacturers need to be prepared for customization if the need arises. For instance, customers may request that their racks be easy to assemble for future maintenance and service purposes, so Chen says some vendors have “developed tool-less features so they can save assembly time and effort when they put a system together.”

He also says that some manufacturers will offer minor differentiations, such as printing a logo on the system or color coding certain components. Make sure your chosen vendor will support your customization needs.

BONUS TIPS:

✔ *Build A Relationship With Your Vendor*

“Work with a trusted hardware and software partner who will listen and understand your needs and who has the building-block solutions and expertise to help make you a success,” says Tau Leng, vice president and general manager at Supermicro (408/503-8000; www.supermicro.com). The manufacturer should see you as a partner rather than just another customer.

✔ *Start Small & Build From There*

Companies need to “start small and grow while they learn about the workload,” Leng says, so they can “determine the balance between compute and I/O priority.” It’s always possible to add more features, such as automation, to your existing system, but you have to ensure you have the right expertise and that your infrastructure can support it, Leng says.

✔ *Put Availability High On Your Priority List*

Availability and redundancy are absolutely critical to high-density storage solutions, because even if you have your big data under control, you won’t be able to use it if there’s a massive hardware failure. Wroe Chen, operations manager at Chenbro (909/947-3200; www.chenbro.com), says that vendors are adding failover features to storage products that will help add an extra level of redundancy and help make sure that data is always available.

The main goal of these features is to prevent data loss and make it so that customers don’t have “to sacrifice data safety in the case of drive failure or an outage that might cause loss of data,” Chen says.

Evaluate Your Disaster Recovery Plan

Plan For The Worst & Be Well-Prepared For The Unexpected

IF YOU WANT TO UNDERSTAND the importance of having a solid disaster recovery plan, look no further than Hurricane Sandy. “With Hurricane Sandy, there were a lot of data centers in lower Manhattan that were flooded,” says Roberta Witty, research vice president at Gartner, noting that there’s a lot that companies have to plan for before something happens.

As you can imagine, experiencing an event as devastating as Hurricane Sandy and having a proper disaster recovery plan in place would be bad enough. But if you don’t prepare ahead of time to know exactly how you’ll respond to a disaster, you could be putting your business in jeopardy. That’s why it’s so important to either put a plan in place if you don’t have

one already or take steps to improve your existing plan to make sure your business will be up and running even if a major disaster hits home.

✓ Perform A Business Impact Analysis

When you first start looking to improve your existing disaster recovery plan or create a new one from scratch, you need to be aware of what types of equipment, applications, and data need to be protected and backed up for future recovery. Rachel Dines, senior analyst at Forrester Research, refers to this as a business impact analysis, which is designed to help you build a set of recovery objectives for various applications and other mission-critical solutions.

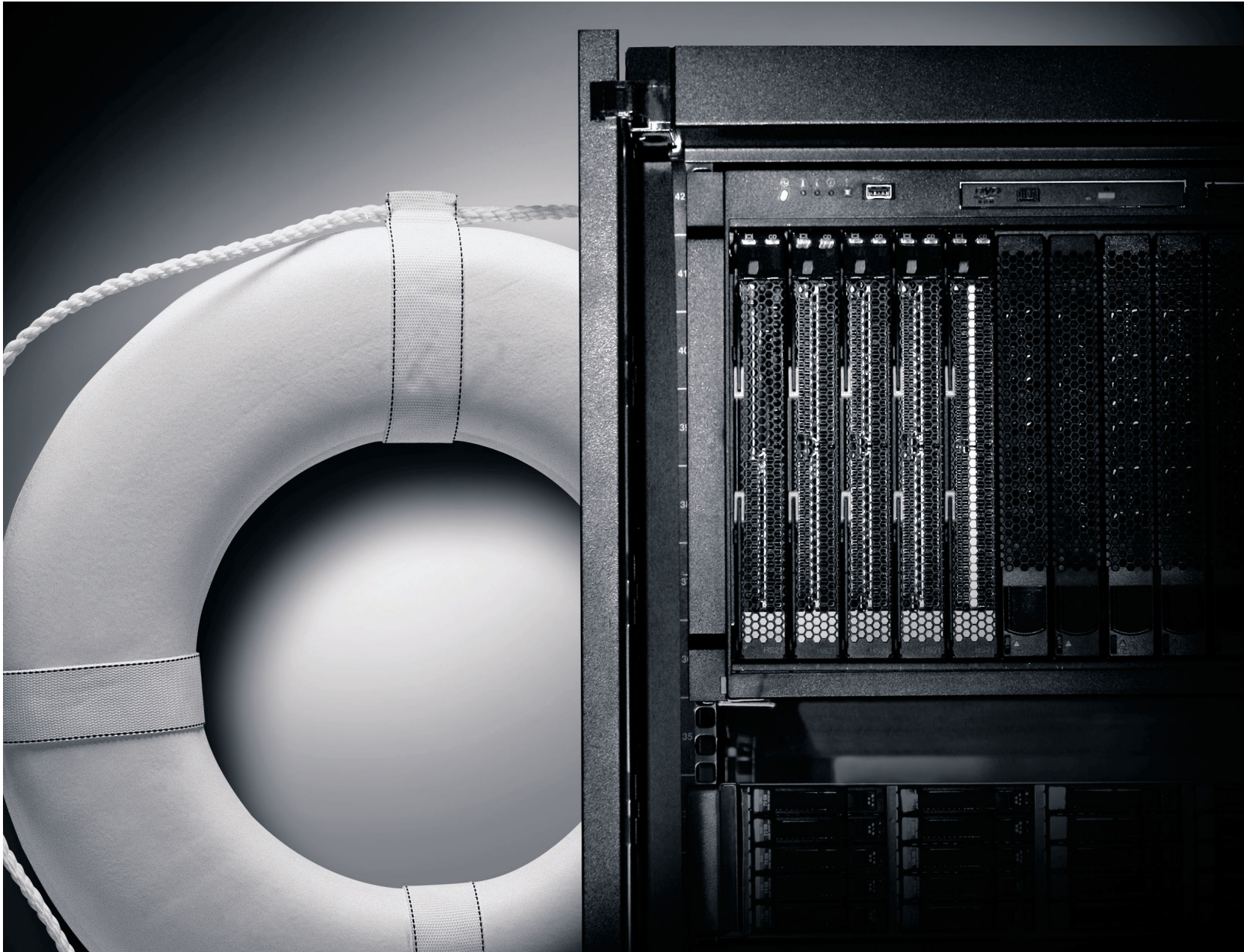
“A business impact analysis involves working with business leaders to understand what the most critical systems are to them, what happens to the lines of business when the IT systems are unavailable, and what the impact of lost data is,” Dines says. “You will also need to determine what the interdependencies are between systems and a high-level cost of downtime. After that, you can begin to build a technology architecture and strategy that will meet these objectives.”

✓ Thoroughly Test Your Disaster Recovery Plan

Once you have your plan in place, Witty says, you’ll need to run through it. “A plan on paper is worthless,” she says. “You have to actually go through the

steps of executing that plan, which means that people are moving to the recovery data center, bringing up new hardware, loading up new software and applications, restoring the data from whatever backup media you’re using, and then having the end user log on and try to access the application. There is no other way unless you actually have a disaster, and then it’s trial by fire, which is the absolute worst time to do this.”

From there, you need to determine whether this plan will meet your RTO, or recovery time objective, which is the maximum allowable downtime—how long a system can be out of service without really hurting the business, Witty says. She recommends that companies look for “pain points,” which will help





determine whether an item should be added to the disaster recovery plan. Pain points can be easily discovered either before testing begins or during the testing process, which is much more effective than attempting to remedy them after the fact.

✓ *Offsite, Onsite, Or Both?*

Another crucial part of your disaster recovery plan is determining whether you want to handle disaster recovery in-house or outsource to a third-party vendor. And while there are many things that factor into that decision, it ultimately depends on what is the proper fit for your environment. “There is no right or wrong answer for how to source disaster recovery, but

it’s important to make an informed decision,” Dines says. “For example, if you decide to run disaster recovery completely in-house, ask yourself, ‘Do we have enough internal resources to dedicate to running it?’ Or, if you want to completely outsource disaster recovery, ‘Are our business and IT requirements changing too rapidly to consider a long-term disaster recovery contract?’”

Witty agrees that both technology and employee resources are important to consider, but she adds data classification into the mix. “A lot of companies have designated data classification, or classes of data that can’t be stored off-site or in a third-party environment, so they have to have their own recovery data center for that class of data,” Witty


says. She also adds that some types of data can’t be stored in locations outside of a given country, which also limits the options for third-party vendors. The key to this decision is determining what the compliance issues are in your specific industry and if you can handle the responsibility from both financial and resource perspectives.

✓ *Have A Data Recovery Expert Lined Up Just In Case*

Despite your best preparations, there’s always a chance you could experience both a data failure and a data recovery systems failure at the same time and even the best disaster recovery plan could fail. That’s why you should consider having a

data recovery expert lined up and ready to go.

For example, Jason Buffington, data protection analyst at Enterprise Strategy Group, says to consider a cloud provider, which can typically offer the same quality of training and support as on-premises backup providers. Thus, enterprises should have high expectations where experience of deployment, skills, and knowledge building are concerned.

If a disaster occurs, in many situations, companies are simply blindsided by the unexpected and aren’t sure how to react. But if you have a plan, regularly test your data recovery solutions, and have a third-party expert ready, then you have a much better chance of surviving data failure and getting your data back with as little downtime as possible. 

✓ *Consider Workforce Resilience*

Roberta Witty, research vice president at Gartner, says workforce resilience is a key part of disaster recovery initiatives. Storms such as Hurricane Sandy and other disasters cause large-scale damage not only to businesses, but also to the lives of workers. For that reason, she stresses how important it is to prepare for potential disasters well ahead of time and know how you’ll make sure employees are able to work, regardless of where they are.

“When we’re starting to talk with organizations about their planning process for Sandy, they were already starting to move their people the week before Sandy actually struck,” Witty says. “They were moving their critical personnel outside of the New York region to recovery sites and housing them in hotels, so that they could get to the recovery site and start response and recovery operations. They’d already made the call and switched over operations to their recovery site, or put their disaster recovery service provider on alert that they were going to do it.”

✓ *Emphasize Location*

With a disaster recovery plan, it’s crucial to take location into account. You not only need to locate your recovery site in a place less prone to potential disasters but also consider the other facilities, organizations, and agencies around your company.

“You have to look at your neighbors,” says Roberta Witty, research vice president at Gartner. “Are you across the street from a military base or a government agency? Are you across the street from a chemical factory where you could have a biohazard? You have to understand not just your location, but the region within five miles. There could be something going on in major transportation arteries, where they shut down and your staff can’t get to work. You have to understand what your production issues are, and then you look for a location where those same risks aren’t going to happen.”

BONUS TIPS:

✓ *Train & Educate Employees*

“One of the lessons learned time and time again from companies that have actually declared disasters is that the biggest challenge is people not knowing what their role was during the recovery process,” says Rachel Dines, senior analyst at Forrester Research. “Testing, in essence, is about training, so the more you test, the better trained staff will be.”

✓ *Invest In Communications Infrastructure*

“Communicating with employees, customers, stakeholders, and partners is always a headache during a disaster declaration, especially if email and phones are down,” Dines says. “Automated communication systems can speed up recovery by helping you coordinate the right people to be in the right places to execute plans.”

BUYING TIPS:

UPSes



IF A POWER OUTAGE OCCURS and a data center doesn't have UPSes that can meet the necessary power requirements, the result will be potentially business-crippling downtime. Here's what to keep in mind as you're comparing available options.

✓ *Learn Your Total Load & Maximum Runtime*

"You have to start with some basics and be armed with some knowledge before making a selection," says Brett Femrite, director of business development at Rackmount Solutions (866/207-6631; www.rackmountsolutions.net).
"You'll need to know the voltage of the electrical service that will power the UPS," Femrite says.
In addition, know the minimum time UPS batteries must provide power and the maximum runtime needed. Ken Koty, sales engineer at PDU Cables (866/631-4238; www.pducables.com), says if you have diesel generators, typically 15 minutes of battery backup time is standard.
"You have to decide what your uptime goals are," Koty says. "If all you're looking for is enough power to allow a safe shutdown, simple inexpensive UPS systems may work out just fine. For mission-critical facilities where uptime is paramount, a parallel system utilizing redundant systems, dual bus, or a combination of both may be required."

✓ *Know The Features & Options*

The UPS features your enterprise needs can depend greatly on the protection level required for given applications. To start with, you need to determine an appropriate UPS configuration, Koty says.
"What type of system will work best at your facility: static or rotary?" With a rotary system that has centrifugal ride-through, Koty says, you will not have to purchase batteries. But with a small window of ride-through time, the diesel generators must start or your data center will go down. "You have no time to react if diesel generators fail to start or utility power cannot be restored," he says.
"If you have dirty power, you'll want a UPS system that can handle more than just a straight power loss." Make sure your UPS can handle power anomalies such as spikes, surges, swells, or sags as well as it handles a straight loss of power, Koty says.
You also need to check the efficiency rating of the system, Koty says. Because it most likely will be running 24x7, a system with low efficiency can add up in operating costs over time.
Femrite agrees and adds that, although it's desirable to have a UPS with a high efficiency rating, external bypass switches that enable power to bypass the UPS for maintenance purposes, monitoring capabilities (local and remote), warranties

(system, batteries, etc.), and high-performance filtering, "they may not all be needed or cost-effective."

✓ *Plan For The Future*

Koty says a common mistake is not planning for future electrical needs. "Make sure the system you buy can either handle the needs of the data center as it will be built out, or make sure that it is modular in design so that, as electrical needs increase, additional UPS units can be installed/integrated without disrupting the existing systems." If you're buying a modular system, make sure to size the input feeds to your system to accommodate the maximum upgrade size, he says.
When planning for future growth, don't forget to account for unexpected additions that inevitably crop up. But perhaps most important, purchase the right-sized UPS for your needs today. "Too small of a UPS system may need to be replaced as power consumption increases or risk failure; too large of a system is inefficient," Koty says.
✓ *Check For Support & Service*
As you're narrowing your UPS choices, compare vendor service and maintenance. Koty says to check what local representation the UPS company has in your area. "Typically you will want a maintenance contract that will guarantee a 30-minute callback and no longer than four hours to have a person onsite." ■

BUYERS' CHECKLIST

- ✓ Determine your power and protection requirements.
- ✓ Ensure the UPS can handle the required loads.
- ✓ Make certain the UPS provides sufficient runtime and capacity.
- ✓ Determine warranty, insurance, and guarantee requirements.
- ✓ Plan for future needs and requirements and be sure to account for unexpected additions.

KEY TERMS

- line-interactive**
A UPS with built-in line-sensing abilities to regulate high- and low-voltage levels; an inverter activates when power loss occurs and the system switches to battery power.
- online**
A UPS type providing the highest protection level; the inverter is online and operates constantly to eliminate incoming surges and low- and high-voltage issues while delivering clean power.
- standby**
A UPS type that runs power through surge suppression to connected equipment; after a power outage, the UPS switches to battery backup power, reverting to AC power when power returns.

BUYING TIPS:

Equipment Recycling & Disposal Services



WHEN YOU'RE DEALING with old equipment, you typically have two options: reuse it in another capacity, such as repurposing an old server for an application that doesn't demand mission-critical performance, or use a vendor that specializes in refurbishing, recycling, and disposing of old equipment.

A vendor can ensure equipment is handled in an environmentally responsible manner while abiding by privacy and compliance regulations. Here's what to look for.

✓ *Know Your Equipment & Needs*

The first step in equipment recycling and disposal is to understand your equipment and the capabilities of the recycling company, says Ken Koty, sales engineer at PDU Cables (866/631-4238; www.pducables.com).

"Can your equipment be recycled whole, or must it or parts of it be destroyed? How are you going to handle hard drives or other media devices? Are you going to remove them yourselves and destroy them prior to recycling, or is the service qualified to destroy them for you?" Be sure any servers you are disposing of have all of your data removed, Koty says, and consider pulling and destroying the data drives prior to recycling the rest of the equipment.

"If you have specific needs for the way equipment is destroyed, ask for a certificate of destruction as verification of the service provided."

✓ *Compare Providers*

When comparing service providers, examine what the services are offering, says

Brett Femrite, director of business development for Rackmount Solutions (866/207-6631; www.rackmountsolutions.net).

"Some of the larger companies charge for asset disposal, while others will pay you for the equipment. Smaller regional companies can often provide more cost-effective solutions because of local transportation, labor, and processing," he says. Companies that offer to pay you may provide revenue sharing and the ability to purchase other refurbished hardware. "Ask for referrals, performance reports, or projections up front. Looking at past disposal lists will make it easy to forecast what you can expect," Femrite says.

Steven Freedman, president of FMI Recycling (214/747-6525; www.fmirecycling.com), says there are two common options: in-house demanufacturing, which is best for high-grade materials, and equipment shredding, which is best for low-grade materials.

Koty says you want a reputable company with a good track record. Find out how long the vendor has been in business and ask for (and check) a list of previous clients.

✓ *Check The Facilities & Processes*

Don't automatically look for the least expensive company, Koty says. "Even if the outside firm produces all the proper paperwork and has a good sales pitch, there could still be liability issues for the data center if the firm doesn't follow proper disposal procedures," Koty says.

That's why he recommends visiting the asset disposal firm onsite and inspecting the


disposal procedures. Check what security and surveillance the vendor uses, how it can assist with ROI for current projects, and what documentation processes it uses.

Freedman says you need to make sure the recycling company securely handles and processes material. "Do they monitor destruction and wiping of material? Do they process material in-house? Is the company credible? Is the company certified?"

Find out how equipment is picked up and handled, who pays for shipping, where equipment ends up, when you will get paid, and if the vendor can assist in other ways such as providing new products or offering credit from old equipment. Know if the vendor has downstream vendors and who they are.

✓ *Onsite Or Offsite Destruction?*

With data destruction, you have two choices: onsite or offsite. With an onsite service, you'll remove the need to deal with chain of custody documentation. For data centers that store a lot of sensitive data and want to physically destroy the data, you'll enjoy the peace of mind that comes with watching the destruction take place.

If you want absolute destruction that's beyond any type of recovery, an offsite data destruction service may be ideal as service providers typically have more powerful shredders at their facilities than mobile shredder services can offer, plus a number of offsite data destruction services also double as a reprocessing center that can remarket the parts, so you can get some return value for your used equipment. 

KEY TERMS

certificate of destruction

When a recycling company issues a COD, it assumes responsibility for the equipment and certifies the material was processed or destroyed. This releases the customer from all liabilities.

data wiping

A process used for compliance and privacy reasons in which data is entirely destroyed or erased from equipment such as hard drives.

BUYERS' CHECKLIST

- ✓ **Homework.** Compile a list of equipment you no longer need, then determine its resale value, what businesses might purchase the equipment, and how the resale value can help fund new purchases.
- ✓ **Qualifications.** Determine how long the prospective vendor has been in business, what its reputation is in the industry, and what compliancy and certification measures it operates by and has achieved.
- ✓ **Broker or provider.** Determine if the vendor actually provides recycling and disposal services or is just a broker of such services.
- ✓ **Process.** Clarify the methods the vendor uses to process equipment, including who handles equipment, where it goes, how long processing takes, and what documentation you can expect.

BUYING TIPS:

Find A Used Equipment Vendor

FINDING A VENDOR YOU CAN TRUST. The process really isn't that difficult, but there are a few things you should keep in mind to help minimize the chances you'll run into problems.

✔ **What To Look For In A Dealer**

In the retail world, a popular advertising tagline is "Why buy new when slightly used will do?" That philosophy also holds true in data centers and other enterprise-level environments, where companies are increasingly purchasing quality used or refurbished equipment in an effort to save money.

Although buying refurbished equipment can result in significant cost savings, there are factors to be aware of before you go shopping for used gear, and chief among them is the vendor from whom you will be buying your equipment.

Do your homework. Make sure the company providing the used equipment has the means and the expertise to give you equipment that's either good as new or as close to it as possible.

Get references. As you research who's behind the equipment you're buying and how they're backing it up, obtain customer references and follow up with each.

Follow licensing requirements. The refurbishment business has progressed to a state where there isn't a lot of equipment that can't be found used and at an OEM level of quality—or sometimes better. But some OEMs make it impossible, by virtue of their software licensing policies, to get a good deal on refurbished equipment. A lot of resellers will try to sneak past these licensing policies, which could come back to harm you in the end, so it's important to find a reputable seller who stays to the right side of these requirements.

✔ **Beware The "Too Good" Price**

The old adage certainly applies to refurbished equipment prices: If it seems too good to be true, it probably is. If several vendors quote similar prices, but one vendor quotes a price that's significantly lower, put on your skeptical face and dig a little deeper.

✔ **Find A Reputable Reseller That Offers Its Own Warranty Policies**

When it comes to warranties for used equipment, there are several different scenarios you could run into depending on the vendor you work with. In general, there should be a 90-day warranty, with the ability to obtain a longer warranty (typically one to three years), similar to the original warranties offered by product manufacturers.


In addition, resellers may offer other benefits such as providing 52 PCs for the price of 50, so that if one PC goes down, you could ship it back for a replacement and meanwhile make use of the spare.

But also understand what isn't covered under warranty. Warranty and exchange policies often don't cover issues such as damage caused by the end user or a force majeure. You'll want to have some sort of disaster recovery service in place, which could include getting items on quick ship from your reseller.

✔ **With Equipment Disposal, Check For Legal & Regulatory Compliance**

Depending on your data center's line of business, an equipment disposal service may need to meet specific certifications for you to be legally covered.

"Make sure that the company you do business with has the right certifications and credentials, such as ISO 9001 [and] ISO 14001 registration; [that the company is] MOE and EPA regulated; and that they have a history of compliance with all applicable environmental laws and regulations," says Brett Femrite, director of business development for Rackmount Solutions (866/207-6631; www.rackmountsolutions.net).

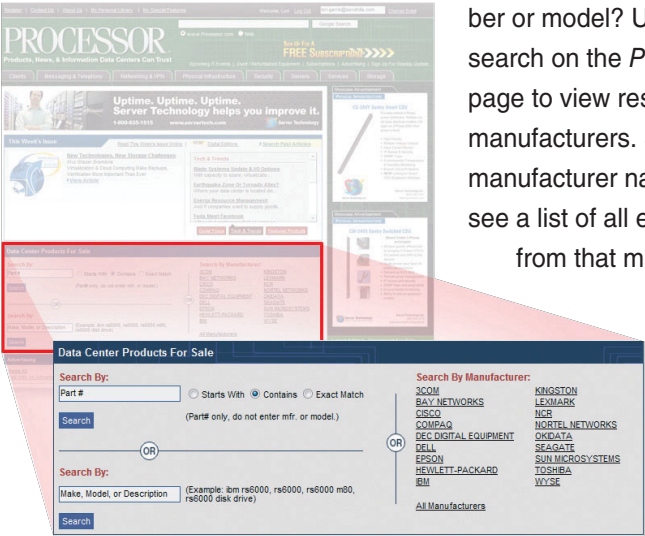
"You should also be sure they have safeguards in place to protect company and personal information through the entire process." Other key legal steps should include the physical security of the device throughout the entire used equipment process. 

USE PROCESSOR.COM TO FIND DATA CENTER EQUIPMENT

Looking for help pinpointing the products you need, from vendors you can trust? Finding the equipment you need is easy with *Processor's* online Data Center Products For Sale database.

From *Processor's* home page (www.processor.com), you can search for a specific part number, make, model, or description. Enter the information in the appropriate box and click Search. You'll see a list of available equipment. If you don't see the particular piece you're looking for, scroll to the bottom of the search results page to conduct a more detailed search. There, you can search by part number, model, price, location, and more.

Don't know the specific part number or model? Use the drill-down search on the *Processor* home page to view results from specific manufacturers. Simply click the manufacturer name, and you'll see a list of all equipment listings from that manufacturer.



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Follow the on-screen directions from there!

BUYING TIPS:

Data Center Cooling

DATA CENTERS run more efficiently and reliably with the proper temperature, and uptime is everything. Having the right equipment is essential. Here are things to keep in mind as you’re looking for the best cooling system for your data center.

✓ *Plan, Plan, Plan*

“Probably the most frequent mistake made by owners purchasing equipment is not knowing the load. In some cases they overestimate the load, requiring too much cooling equipment, which causes cost and operational problems. On the other side of the spectrum, underestimating load results in hot spots or worse,” says John W. Martin, marketing manager at Data Aire (800/347-2473; www.dataaire.com). Get a qualified mechanical engineer with data center experience involved early in the process to ensure you get the size and type of equipment to meet your requirements, he says.

Gina Dickson, director of infrastructure products at Black Box (877/877-2269; www.blackbox.com), says you need a strategy. “Establish a cooling methodology for your data center. Raised floor or no raised floor? Hot aisle/cold aisle? Containment? Perimeter cooling or localized cooling? A combination of methods?”

Along with that, you need to understand the total investment and what you need for the cooling equipment. “For example,” Dickson says, “liquid cooling using chilled water is extremely efficient, but if you do not have access to a chiller or a budget to purchase one, this is not a good option.”

Dickson says you’ll also need to know what type of maintenance is required for the equipment, what warranty comes with the equipment, and whether you can purchase a service agreement.

✓ *Ensure The Unit Can Keep Up With Demand*

Make sure the unit you want is designed for 24/7 cooling and can maintain the temperature you require, says Mike Paulson, president of AmeriCool (800/680-0725; www.americoolinc.com). Particularly with portable air conditioners, he says, a common mistake is purchasing a unit that is not designed for commercial applications and environments. “With most data center managers wanting their rooms kept at 68 degrees, it is important to find a unit that will cool below 68 degrees and run 24/7,” he says.

Dickson says the cooling equipment needs to be able to scale. “Think about not only what is in the room now, but what

you plan to add or think you might add over the next three to five years . . . You don’t want to have to do a total rebuild or buy a new CRAC/H unit,” she says.

✓ *Decide Between Portable & Permanent*


Weigh the pros and cons of portable and permanent air conditioning systems, says Clark Michel, vice president of Atlas Sales & Rentals (800/972-6600; www.atlassales.com). “The installed cost of a portable cooler can be dramatically lower,” he says, as a permanent system often entails at least some construction and installation costs. Plus, maintenance is also simpler with portable systems.

When purchasing a portable unit, Michel says, consult with your equipment supplier to

make sure you get a unit that will handle the total heat load. “It is actually not a bad idea to oversize portable equipment slightly.”

✓ *Don’t Forget About Airflow*

“A great deal of money is thrown away on cold air that just doesn’t reach the equipment,” says Laura Viars, senior sourcing specialist at Rackmount Solutions (866/207-6631; www.rackmountsolutions.net).

Data Aire’s Martin agrees, adding, “The most important issue in data center cooling is airflow management, starting with hot aisle/cold aisle, blanking panels, and sufficient room under the floor to allow for air distribution.” If you can add filler panels and other add-ons to your cabinets and racks, then you can direct cool air to where it’s needed.” 

BUYERS’ CHECKLIST

- ✓ How many BTUs do you need to keep your equipment at the appropriate temperature?
- ✓ Do you really need the additional cooling equipment?
- ✓ Do you need a closed- or open-loop system?
- ✓ Where will the cooling equipment be located?
- ✓ How much of a concern is noise output?

KEY TERMS

British Thermal Units (BTUs)

Used to measure the amount of energy required to heat a liquid such as water. A single BTU represents enough energy to raise the temperature of one pound of water by one degree Fahrenheit at a constant pressure of one atmosphere. In the context of cooling equipment, BTUs are listed as a given rating per hour.

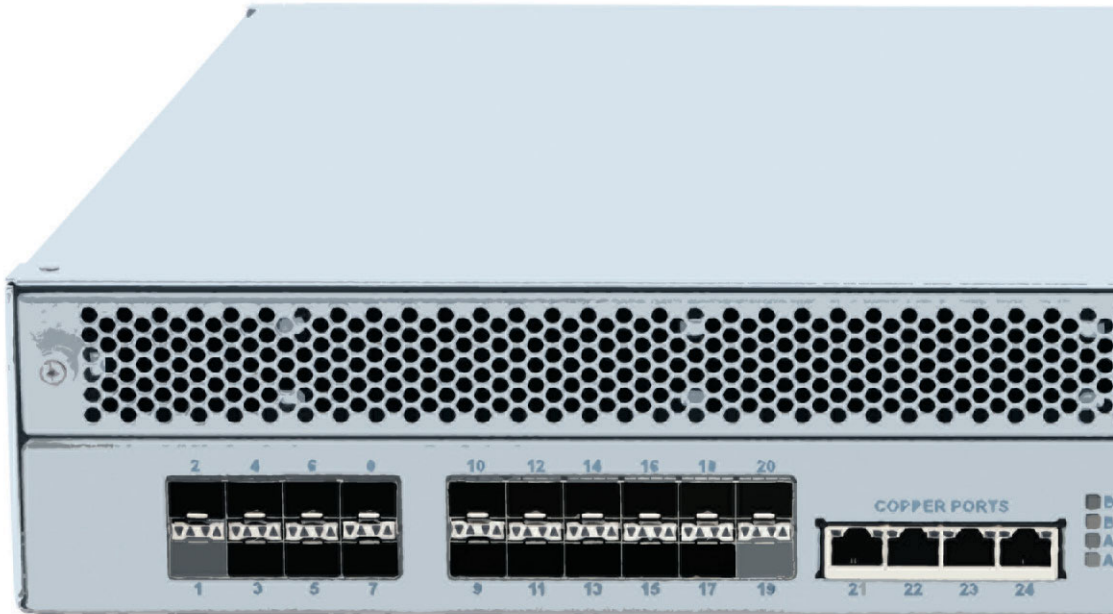
cooling capacity factor (CCF)

The ratio of total installed nameplate capacity to critical load. This ratio should be about 1.2, or 120%.

power usage effectiveness (PUE)

A technique used to help enterprises measure how much of their total data center energy usage is going toward IT and computing equipment.

BUYING TIPS:



Networking Equipment

THE HEALTH of a company’s network is crucial to its productivity. As such, choosing the right equipment to run your enterprise network can’t be taken lightly.

As you evaluate how you’re going to manage your unique network and improve metrics overall, here’s what to watch for.

✓ Seek Advice

The road leading up to actually buying next-generation network gear should be filled with staying current on standards, protocols, and vendors’ proprietary features. Doing so, says Rob Enderle, principal analyst for Enderle Group, can save time in narrowing down vendors and exactly what equipment is available that can meet specific needs. “Like a fine wine, you don’t implement a standard before it’s time, but you don’t want to be excessively late, either,” Enderle says. “Otherwise, you’ll likely pay a premium for aging technology. Stay informed.”

✓ Look For Cost-Effective Upgrades

It’s important for small to midsized enterprises to look for ways to upgrade networking equipment cost-effectively. Eric Hanselman, research director, networks at 451 Research, says a first step is assessing the performance of the various components of the network.

Surveying network performance can pinpoint whether core, edge, or access are areas that need attention. Wireless performance can be more complex to accurately assess, Hanselman says. Because the radio frequency performance varies with physical building constraints and the wireless devices involved, companies may need to enlist expert help. “Simply adding more access points can often make a bad situation worse,” he says.

Alan Weckel, Dell’Oro Group senior director of data center appliance, enterprise telephony, and Ethernet switch market research, says that reducing spare capacity is the biggest way to cut costs.

✓ Go To The Core

Core network upgrades can add capacity that elements at the network edge can leverage, Hanselman says. “This is a good investment if there is congestion in the core, and this is often the case,” he says. “If access performance is a bottleneck, either for devices or for traffic headed to the Internet or wide area network, a core upgrade won’t make a noticeable difference.”

One possibility for cutting costs when upgrading core networking gear is acquiring used or refurbished components. Hanselman says such gear can offer reasonable value, “as long as it’s still actively supported by the manufacturer.” Support, he says, must include the firmware and OS.

“For some manufacturers, equipment components can be upgraded without replacing a whole chassis,” he says. “Control or supervisory module upgrades may be available in both new and refurbished equipment.” Weckel sees this approach more as an option for smaller enterprises, “as a switch from a Fortune 50 company that is three years old is still probably feature-rich for what an SMB may need.”


✓ Bargain For Better Prices

Vendors are often willing to get aggressive with pricing, especially if

they know competitors are in the picture. Pin down your list to two or three vendors that you’ll be happy with and then start bargaining.

Where the ideal time to buy is concerned, Enderle says it’s helpful to have someone you trust who is active in the standards efforts in on the decision “so they can tell you of the pitfalls and help you with timing,” he says. “This ensures you neither buy early nor late.”

✓ Take Your Time

Spending the time necessary to implement a network refresh correctly can result in time and money savings later. “Much of the cost connected to any technology change is the result of mistakes that result in the firm buying what they don’t yet and may never need and in undoing bad decisions,” Enderle says. 

BUYERS’ CHECKLIST

- ✓ Is the product designed for the needs of your particular enterprise?
- ✓ Is purchasing used equipment an option?
- ✓ Are you up to date with current standards and protocols?
- ✓ Is this upgrade something you will take advantage of now or in the near future?

KEY TERMS

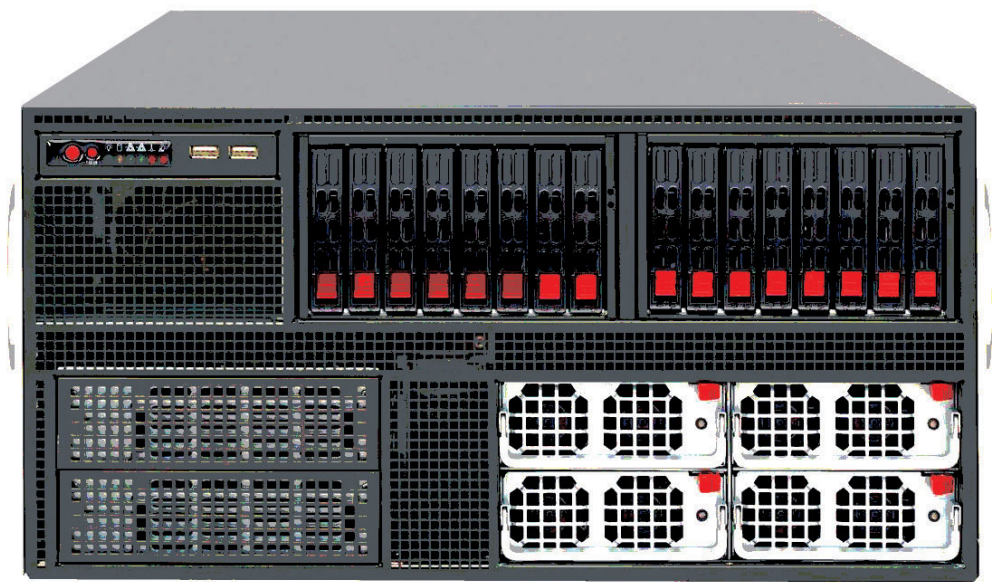
Gigabit Ethernet (GbE)

Technology for transferring information at the rate of 1 billion bits per second. Other high-speed standards include 10GbE, 40GbE, and 100GbE.

IPv6

A communications protocol designed to replace IPv4 and prevent the problem of running out of potential IP addresses. IPv6 uses 128-bit addressing, compared to IPv4, which uses 32-bit addressing.

BUYING TIPS: Servers



BUYING A NEW SERVER takes significant prep work. Beyond pinpointing the data center’s needs and how the server will meet them, there are budgetary, compatibility, and vendor considerations to address, as well. Because servers are so essential for businesses, IT managers must understand when it’s time to buy new servers, and as with any IT purchase, the goal should always be to invest in a solution that will give the company the performance it needs for years to come.

✓ *Determine The Features That Are Most Important*

Charles King, president and principal analyst at Pund-IT, counts CPUs, memory, and I/O as the most critical server features, though their relative importance depends on the application and workload they’ll support. Companies running a business-critical database or online transaction program, for example, should eye a higher-end CPU/system than what’s needed for general-purpose applications. For virtualization-related use, spend more for extra memory and I/O.

Mark Bowker, Enterprise Strategy Group senior analyst, says that too often, IT purchases a server with more capacity than needed, which provides the comfort of extra headroom but also incurs additional expense. At the same time, though, you want to future-proof your investment as much as possible by looking for efficient, power-saving servers that can help lower energy costs in the short and long term.

“IT should understand what the latest processor chipset is on the market and what the stated road map of the chip manufacturers are,” Bowker says. “This will help avoid buying into servers that are at the end of a product life cycle.”

Tau Leng, Ph.D., vice president and general manager of corporate marketing and HPC solutions at Supermicro (408/503-8000; www.supermicro.com), adds that today’s server systems are available with a variety of processor technologies and form factors. “Customers often purchase equipment that is overdesigned with unnecessary features,” he says, which is why it’s essential you work with an experienced and reliable partner that can offer a variety of solutions.

In addition, Leng says, adherence to standard rack unit is important to allow for easy interchange of servers. Remote management features also are critical, and

power savings is becoming an important element in TCO determinations.

✓ *Watch For Trends*

Leng says one relatively new trend in servers is high-temperature free-air-cooled server environments, which can reduce electricity demand and rein in costs.

Virtualization and consolidation are also having an impact. John Sloan, lead analyst for virtualization and consolidation at Info-Tech Research Group, says it’s important to know how a server will fit into a consolidated stack that includes servers, networks, and storage.

Unlike distributed models, Sloan says, “in a consolidated infrastructure, the server is a unit of hard capacity (processing and memory) that’s combined with networks and storage in a resource pool that’s partitioned up into virtual entities.” Increasingly, he says, enterprises aren’t buying servers, but blocks of capacity. What differentiates current offerings “is how the interconnects are managed and how the whole thing is

managed as one resource pool,” Sloan says. Typically, blade servers are the form factor for consolidated offerings, he says.

✓ *Consider Your Budget & The Total Cost Of Ownership*

Before you get started with a server upgrade or replacement, be sure to carefully plan your budget. Don’t forget that the total cost of ownership includes many different items beyond just the upfront server cost. Possible expenditures include those related to equipment, software licensing, labor, telco and power company services, facility improvements, vendor support, and downtime. Additional costs related to supporting a new platform can include those for power, network cabling, cooling, rack space, and management personnel, he says.

Sloan says, “In any infrastructure purchase, the upfront capital acquisition cost is just part of the deal. Three- to five-year total costs should be calculated, including maintenance and facilities costs.”

BUYERS’ CHECKLIST

- ✓ Match the application and workload the server will support to the CPU, memory, I/O, storage, and other components it will require.
- ✓ Recognize that virtualization, consolidation, and cloud computing are trending areas where servers are concerned.
- ✓ Ensure the vendor satisfies all questions concerning support, compatibility, performance, and other issues.

KEY TERMS

80 Plus
A certification program that measures power supply efficiency.

form factor
The space a server occupies. Examples include 1U, 2U, 3U, 4U, 5U, 7U, and blade.

Intelligent Platform Management Interface (IPMI)
Technology for remotely monitoring and managing servers.

BUYING TIPS:

Tablets & Smartphones



GONE ARE THE DAYS when pundits questioned whether smartphones and tablets had a place in the enterprise. Desktops and laptops are crucial, but with a tablet and a smartphone, you can conduct business on the go and stay connected to your co-workers and clients.

The key is to find the perfect combination of carrier, operating system, hardware, apps, and other features that fit exactly what your enterprise and employees need to be successful and productive.

✓ *Assess The Need*

Before you even start looking at which tablet or smartphone to purchase, make sure your workforce will actually use them. Letting employees bring in their own devices is one thing, but choosing to issue these mobile devices or fully support them should be a needs-based decision.

✓ *Form A Strategy*

Determining which device can best meet users' requirements is arguably the most important consideration.

"Enterprises should ask themselves, 'Can my employees do everything they need to on these devices,'" says Christian Kane, Forrester Research analyst.

Jack Gold, analyst at J. Gold Associates, says many companies know they have to deploy and support tablets and other mobile devices "because the boss says so," but "they really don't have a strategic plan in place. That's really what's lacking for most companies." Rather than looking at the smartphone, tablet, or other device first, he says, look at the application you want to deploy on it, what you want that app to do, and if you'll build or buy the app. Then decide what device best fits the model.

✓ *Pick The Tablet Based On Your Environment*

As tablets continue to get more similar in terms of features and functionality, it may seem like any tablet will work for your employees. But even though manufacturers are closing the gap on each other, there are still quite a few things to consider when comparing tablets.


For instance, if users are going to be consuming considerable content, it may be helpful to invest in tablets with larger screens. If employees will be using tablets to create content, a keyboard attachment can make productivity faster and easier. But you also may need something that is flexible enough for both uses, so you don't end up with a device-segmented workplace.

✓ *Compare The Applications*

A device's OS determines what types of built-in software and apps are compatible with the device. All mobile OSes have at least some business features, so it depends on which OS supports the apps and services you want to use as well as the devices you want to implement

Depending on the OS, the device may have a number of preinstalled programs, including calendars, email clients, Web browsers, and more. You should try to match your enterprise's existing infrastructure to your device's supported apps.

✓ *Ensure The Device Is Protected*

When shopping for mobile devices, search for onboard security features and available apps that can add an extra layer of security. Some features may include password protection, which will lock your phone or tablet if someone fails to enter the correct password after a certain number of tries. Another feature to look for is the ability to remotely wipe your device if it is lost or stolen. Cases and screen protectors are important for protecting your device's outer shell and its inner components. 

BUYERS' CHECKLIST

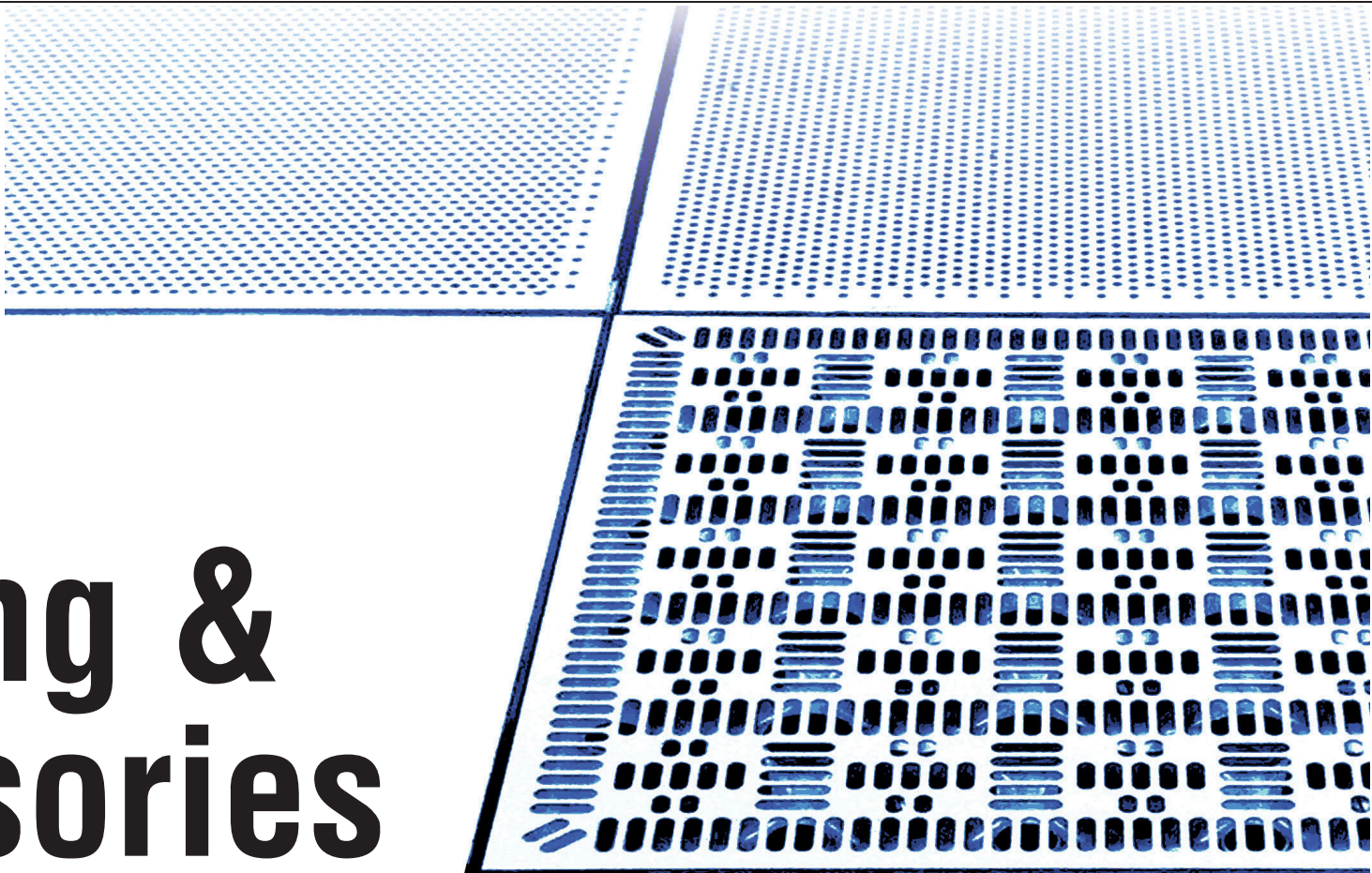
- ✓ **Aim for company-wide compatibility.** If you can supply the same tablet to every user, it will help your IT team be able to secure and manage the devices and easily make updates or wholesale changes if necessary.
- ✓ **Consult end users.** Jack Gold, analyst at J. Gold Associates, says while users' desires shouldn't be the overwhelming driving force in a decision, the user experience and apps they'll use should be.
- ✓ **Keep an open mind.** Don't just automatically pick a certain product because it's from your favorite manufacturer or eliminate one because it's not. Pick the product that's best for your business.

KEY TERMS

- BYOD**
A policy in which enterprise employees are allowed to bring their own devices (tablets, smartphones, notebooks, etc.) from home and connect them to the corporate network. Such policies present network and security issues that need to be planned for.
- carrier network**
The underlying infrastructure belonging to a telecommunications company offering voice or data services. Carriers may appear to be similar, but each carrier will offer different network features.
- form factor**
The overall design of a tablet, smartphone, or other device. Includes elements such as size and shape.

BUYING TIPS:

Flooring & Accessories



YOUR DATA CENTER’S FLOORING can be just as important as the servers and other equipment it holds. Choosing the right flooring provides a stable, efficiently cooled data center. Here’s what to look for.

✓ *Know The Weight*

Raised floor tiles come in different weight capacities, so consider your weight-bearing requirements when selecting tiles, says Ken Koty, sales engineer at PDU Cables (866/631-4238; www.pducables.com). The final floor has to be strong enough to support your equipment at the height of the raised floor. Also be aware of rolling load and use heavy-duty

floor tiles where you will be moving equipment into and out of the data center.

Remember as rack sizes grow and densities increase, your floor tiles may need to support a greater weight than you have today. Plan ahead and install floor tiles to meet current and future needs, Koty says.

✓ *Check The Finish & Material*

Be careful when selecting the floor finish, Koty says. “You don’t want be constantly replacing tiles in high-traffic areas to keep the floor looking uniform.”

Avoid floor tiles wrapped in galvanized metal, Koty says, as the galvanized-wrapped tiles could cause zinc whiskers over time. If you are using

cement-filled tiles, use a sealant to coat any cut edges of your tiles.

You’ll also need to consider static dissipation and material weight, says Laura Viars, senior sourcing specialist at Rackmount Solutions (866/207-6631; www.rackmountsolutions.net). “Data center flooring needs to have a surface that is conducive of static dissipation,” she says, to prevent the build-up of static electricity. In addition, she says, “lightweight solutions, as well as ‘lay-down’ panels rather than bolt-down ones, can make maintenance or swaps significantly easier.”

✓ *Be Aware Of Cooling & Floor Height*

If you can maximize the available space under the floor, you can increase your data center’s overall cooling efficiency. As for the height of the floor, there are some general standards to follow, Koty says:

- 12 inches for less than 1,000 square feet
- 12 to 18 inches for 1,000 to 5,000 square feet
- 24 to 36 inches for 5,000 or more square feet

Koty says if you want your new flooring to accommodate a hot/cold aisle configuration, make sure to plan your under-floor cable layout according to CRAC and PDU/RPP unit locations.

✓ *Check Vendor Experience*

If your company doesn’t have anyone on staff with experience in data center flooring, don’t hesitate to rely on the expertise of a vendor. It can help you choose the right flooring and prevent the need for a potentially costly flooring replacement down the road.

✓ *Opt For Accessories*

You may be tempted to cut corners to save money, but don’t, Viars says. “Don’t compromise on the integrity of your flooring. Make sure floor panels fit together as intended (even if it requires custom cutting/sizing), and spring for the additional airflow management accessories. It might cost a bit more upfront, but it will ensure that your cooling remains effective.”

Koty says if you are planning a new raised floor construction job or a build-out, plan ahead and install brushed floor grommets as the floor tiles are being installed. “If you wait to install the grommets at the time the equipment is installed, you have fewer grommet options, plus there is the added risk of introducing contaminants into the data center.”

BUYERS’ CHECKLIST

- ✓ Do the flooring panels fit your needs and allow for effective cable management?
- ✓ Is there enough open space under the floor for cable routing and cooling?
- ✓ Does your vendor have a stellar reputation and testimonials from past clients?
- ✓ Are all sections of the data center flooring capable of handling the weight and traffic to which they will be subjected?

KEY TERMS

bypass airflow

Conditioned air that does not reach computer equipment. Unintended bypass airflow can occur by escaping through cable cut-outs, holes under cabinets, misplaced perforated tiles, or holes in perimeter walls.

concentrated load rating (also referred to as static load)

Rating specified in pounds of force applied over a one-square-inch area.

directional airflow

Airflow panels such as perfs and grates that deliver air directly to the face of the rack.

panel

The material that makes up the walking surface of a raised floor. Depending on your weight and traffic needs, the panel may be made from steel, concrete with steel reinforcing bars, or aluminum.

rolling load

Dynamic (varying) loads usually created by moving equipment on casters over the raised floor.

Network With Your Peers

At These IT Training & Association Meetings

Across The United States

MAY

See & Do: Build Virtual Machines
In The Cloud With Windows Azure

May 17
New Horizons New Orleans
2800 Veterans Blvd., Suite 330
Metairie, La.
tinyurl.com/NHNOLA051713

Cisco DESGN

May 19
Institute of Professional Learning
500 W. Cypress Creek Road
Ft. Lauderdale, Fla.
www.iplearning.net

CISSP

May 20
New Horizons Washington, D.C.
1331 F St. N.W., Suite 240
Washington, D.C.
www.dcnewhorizons.com

AITP Southwest Missouri

May 21
High Street Baptist Church
900 N. Eastgate Ave.; Springfield, Mo.
aitpspringfield.org/main.html

ISSA Los Angeles 5th Annual
Information Security Summit

May 21, 7:30 a.m. to 6 p.m.
Hilton Universal City
Universal City, Calif.
www.issala.org/summit

AITP Akron

May 21
Akron, Ohio
www.akron-aitp.org

AITP California Southland

May 22
Garden Grove, Calif.
www.aitpcalsouthland.org

ISSA Baltimore

May 22
Concurrent Technologies Corp.
8530 Corridor Road
Savage, Md.
www.issa-balt.org

ISSA Inland Empire

May 28, 11:30 a.m. to 1:30 p.m.
Upland, Calif.
ie.issa.org

Android DevCon Spring

May 28-31
Boston, Mass.
www.andevcon.com

JUNE

IT Con
Akron 2013

June 8, 8 a.m. to 5 p.m.
Holiday Inn Akron West
4073 Medina Road
Akron, Ohio
www.eventbrite.com/event/5932655733#

AITP Washington, D.C.

June 13
Alfio's La Trattorio Restaurant
4515 Willard Ave.
Chevy Chase, Md.
www.aitpdc.org

AITP Wheeling Joint Meeting
With AITP Pittsburgh

June 17
www.aitp-wheeling.org

AITP Southwest Missouri

June 18
High Street Baptist Church
900 N. Eastgate Ave.
Springfield, Mo.
aitpspringfield.org/main.html

SharePoint 2010
SharePoint Designer

June 20
New Horizons Tysons Corner
2010 Corporate Ridge, Suite 200
McLean, Va.
www.dcnewhorizons.com

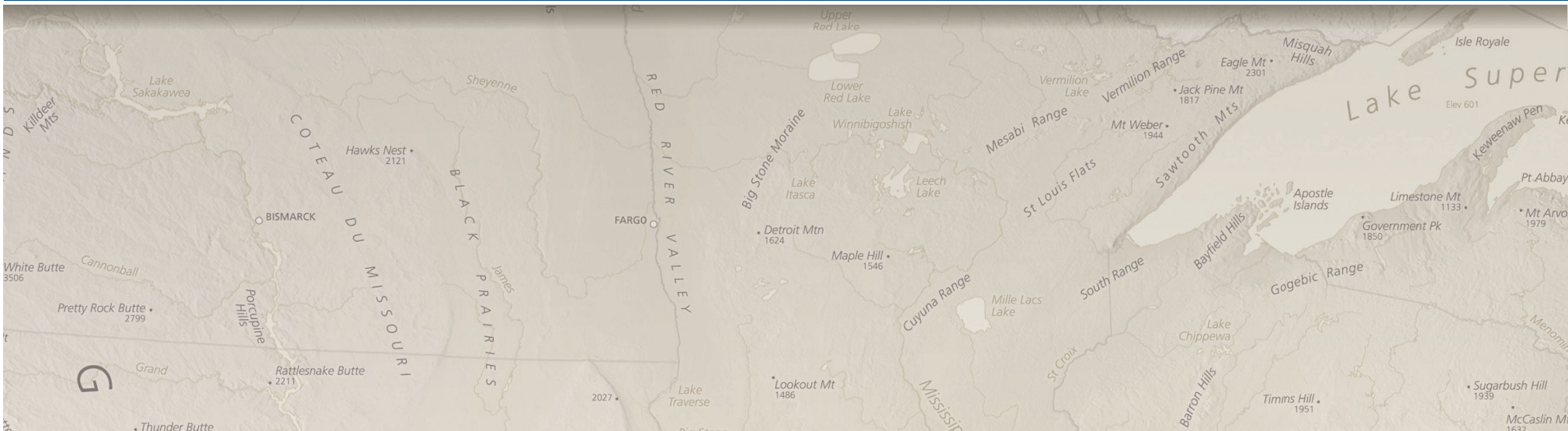
AITP Akron

June 25
Akron, Ohio
www.akron-aitp.org

ISSA Inland Empire

June 25, 6:30 to 8:30 p.m.
Upland, Calif.
ie.issa.org

UpcomingIT Events



AITP
California Southland

June 26
Garden Grove, Calif.
www.aitpcalsouthland.org

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ISSA Baltimore

June 26
Concurrent Technologies Corp.
8530 Corridor Road
Savage, Md.
www.issa-balt.org

JULY

AITP Wheeling

July 10
White Palace at Wheeling Park
1801 National Road
Wheeling, W.Va.
www.aitp-wheeling.org

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AITP Washington, D.C.

July 11
Alfio's La Trattorio Restaurant
4515 Willard Ave.
Chevy Chase, Md.
www.aitpdc.org

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Troubleshooting & Maintaining
Cisco IP Networks

July 15
New Horizons Lexington
1050 Chinoe Road, Suite 208
Lexington, Ky.
www.nhlexington.com

AITP Southwest Missouri

July 16
High Street Baptist Church
900 N. Eastgate Ave.
Springfield, Mo.
aitpspringfield.org/main.html

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AFCOM Greater Tampa Bay
Chapter Social Event

July 17, 12:30 to 4 p.m.
www.tampabayafcom.com

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AITP
California Southland

July 24
Garden Grove, Calif.
www.aitpcalsouthland.org

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ISSA Inland Empire

July 30, 11:30 a.m. to 1:30 p.m.
Upland, Calif.
ie.issa.org

AUGUST

AITP Washington, D.C.

Aug. 8
Alfio's La Trattorio Restaurant
4515 Willard Ave.
Chevy Chase, Md.
www.aitpdc.org

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SharePoint TechCon

Aug. 11-14
Boston, Mass.
www.bigdatatechcon.com

Implementing
Cisco IOS Network

Aug. 12
New Horizons Washington, D.C.
1331 F St. N.W., Suite 240
Washington, D.C.
www.dcnewhorizons.com

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AITP Richmond

Aug. 13
Hilton Garden Inn at Innsbrook
4050 Cox Road
Glen Allen, Va.
www.aitprich.org

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AITP Wheeling

Aug. 14
White Palace at Wheeling Park
1801 National Road
Wheeling, W.Va.
www.aitp-wheeling.org

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AITP Twin City

Aug. 15, 7 p.m.
Ozark House Restaurant
704 McGregor St.
Bloomington, Ill.
www.aitp.org/members/group_content_view.asp?group=75779&id=125369

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AITP Southwest Missouri

Aug. 20
High Street Baptist Church
900 N. Eastgate Ave.
Springfield, Mo.
aitpspringfield.org/main.html

Do you have an event you'd like to see listed?
Send an email to feedback@processor.com.


Processor Solutions Directory

Here are brief snapshots of several companies offering products designed for the data center and IT industry. Listings are sorted by category, making it easy for you to find and compare companies offering the products and services you need.

You can find more detailed information on these companies and the products they offer inside this issue.

To list your company and products, call (800) 247-4880.

PHYSICAL INFRASTRUCTURE




Corning Cable Systems is a leading manufacturer of fiber optic communications solutions for voice, data and video network applications worldwide. We offer the broadest range of end-to-end connectivity solutions for customers' telecommunications networks. We put companies at the forefront of network innovation, pioneering many of the global products and solutions commonly used in state-of-the-art cabling systems.

Products Sold:

- Cabling

(607) 974-9000 | www.corning.com

PHYSICAL INFRASTRUCTURE




Geist is a leading data center provider for power strips, monitoring equipment, cabinet containment & in-rack cooling, and DCiM systems. Geist's power strips are tailored to meet each client's needs and provide unbeatable performance in the data center. Our industry leading monitoring and cooling solutions increase data center efficiencies and make going green easier than ever before.

Products Sold:

- Power
- Cool
- Monitor
- Manage

(800) 432-3219 | www.geistglobal.com

PHYSICAL INFRASTRUCTURE




Rackmount Solutions' mission is to listen to the IT engineer's specific needs and deliver superb-quality, high-performance products through continuous product innovation and operational excellence. We pride ourselves in providing quality customer service, products that fit your IT requirements, and solid value for your money.

Products Sold:

- Wallmount and server racks and cabinets, including sound proof, air conditioned, and large cable bundle
- Desktop/tabletop portable racks
- Shockmount shipping cases
- Bulk cable

(866) 207-6631 | www.rackmountsolutions.net

PHYSICAL INFRASTRUCTURE



AVTECH Software, founded in 1988, is focused on making the monitoring and management of systems, servers, networks, and data center environments easier. AVTECH provides powerful, easy-to-use software and hardware that saves organizations time and money while improving operational efficiency and preparedness. AVTECH products use advanced alerting technologies to communicate critical status information and can perform automatic corrective actions.

Products Sold:

A full range of products that monitor the IT and facilities environment, including temperature, humidity, power, flood, room entry, and UPS

(888) 220-6700 | www.AVTECH.com

PHYSICAL INFRASTRUCTURE




LINDY USA specializes in cables, adapters, electronics and accessories for computer, networking and audio video applications. Since 1932 Lindy has supplied high quality interconnects to customers in commercial, telecom and residential markets. What sets us apart is our complete dedication to innovation, performance and reliability. Our cabling products are truly outstanding.

Products Sold:

- Networking Products
- Audio / Video
- KVM
- Sharing, Converting, Extending
- USB and FireWire
- Input Devices
- Add-On Cards
- Hardware and Security
- Power
- Cables
- Adapters and much more!

(888)-865-4639 | www.lindy-usa.com/

PHYSICAL INFRASTRUCTURE



Since 1979, Simplex Isolation Systems has been setting new design standards in modular expandable cleanroom components, isolation curtains, hardware, and new product development. Fontana, Calif.,-based Simplex's unique strip doors and mounting systems are designed for quick installation. Simplex parts and materials perform with optimum efficiency, last longer, and save you money. And with Simplex, you are always backed by industry expertise, product knowledge, and the best warranties in the market.

Products Sold:

- Cleanrooms
- Strip doors
- Enclosures
- Curtains

(877) 746-7540 | www.simplexisolationssystems.com

PHYSICAL INFRASTRUCTURE



AmeriCool, Inc. is the official sales, marketing, and distribution company for Weltem Air Conditioning products in North America. Our AmeriCool portable air conditioners are built to the highest standards in the industry and offer unbeatable performance, reliability and value. With products ranging from 1 to 5 tons we offer air conditioning solutions to companies small and large. Due to the wide operating range of our product, 24/7 cooling capability and rugged design, our product is a great solution for mission critical needs and harsh industrial applications.

Products Sold:

- Portable Air Conditioning Units

(800) 680-0725 | www.americoolinc.com

PHYSICAL INFRASTRUCTURE



Based in New York City, Hergo Ergonomic Support Systems is an independent designer and manufacturer of enclosure cabinet solutions, technical computer furniture, and modular racking systems. The company's products are designed to promote organization in the workspace and to increase the productivity of computers, peripherals, and communications equipment. Hergo is known for its high-quality products and superior customer service.

Products Sold:

- Racks
- Computer desks
- Enclosures/cabinets
- Cable management
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PHYSICAL INFRASTRUCTURE



Data Aire, Inc. has been designing and manufacturing precision cooling equipment for more than 40 years. We established some of today's industry standards, such as scroll compressors, steam generator humidifiers and microprocessor controllers. Our equipment can be found in any size organization or data center, from a closet to a Fortune 500 financial data center or government high security operation center. With our experience and expertise we can, and are willing, to design and build equipment to meet our customer's needs. With the shortest delivery times in the industry Data Aire can meet your requirements.

Products Available:

- Floor Mounted Units – CRAC or CRAH
- Specialty Units
- Ceiling Mounted Units
- Heat Exchangers
- Rack and Row Solutions
- System Controls

(800) 347-2473 | www.dataaire.com

PHYSICAL INFRASTRUCTURE



Atlas has specialized in portable air conditioning since 1979 and leads the industry in server room and data center portable cooling. We offer "24/7" response from company-owned, full-service offices around the country, each stocked with a wide inventory of equipment for primary, supplemental, or emergency cooling. All portable items are available for sale or rental. Atlas is a Preferred MovinCool® Distributor and a GSA Certified MAS Contractor.

Products Sold:

- 1-5 ton portable air conditioners, air and water-cooled
- 12-ton portable coolers designed to roll through a standard doorway
- Ceiling-mount air conditioners – full line of MovinCool® packaged a/c units

(800) 972-6600 | www.AtlasSales.com

PHYSICAL INFRASTRUCTURE



Snake Tray designs and manufactures a series of innovative and labor-saving cable management, power/data distribution enclosures and airflow managers. Our products are designed to lower the total cost of construction.

Products Sold:

- Cable Management Systems
- Cable Trays
- Power Distribution
- Power and Data Distribution Enclosures
- Airflow Management Systems

(800) 308-6788 | www.snaketray.com

PHYSICAL INFRASTRUCTURE



RackSolutions has been serving the data center market for more than 10 years. All of our products are designed, engineered, built, and shipped under our own roof. We have product solutions available for every major OEM, but if one of our existing products doesn't fit your needs, our top-notch mechanical and electrical engineers can create the item you need from scratch, solving even the toughest installation design challenges. Best of all, we typically don't charge up-front fees for design services.

Products Sold:

Computer server racks, cabinets, shelves, and mounting products.

(888) 903-7225 | www.racksolutions.com

PHYSICAL INFRASTRUCTURE



Founded in 1995, Austin Hughes Electronics Ltd is a design and manufacturing group that offers a broad range of solutions based around 19 inch rack mount technology. With a wealth of experience Austin Hughes design and development teams are focused to rapidly transform customer requirements and market trends into saleable solutions.

Products Sold:

- Infra solution Cabinet Smartcard Handels
- InfraPower Cabinet Intelligent PDUs
- CyberView Rackmount KVM & LCD Console Drawer
- Environmental Sensors

(510) 794-2888 | www.Austin-Hughes.com

PHYSICAL INFRASTRUCTURE



C.E. Communication Services (CE COMM) distributes, markets, designs, and manufactures Data Center products, specializing in Network Infrastructure, Cable and Wire Management, and Fiber and Copper Cabling.

Products Sold:

- Patented Cable Management Systems for CISCO Catalyst and all 1U Switches
- Standard & Custom Data Center Cable Assemblies: Copper CAT5E, CAT6 & 6A
- High Density Optical Fiber Assemblies
- Fiber Connectivity, Fiber Test - Inspection and Media Conversion Equipment

(866) 966-1555 | www.cecommunication.com

PHYSICAL INFRASTRUCTURE



As an integrator and master distributor providing quality power solutions, HM Cragg has built a reputation as the company that delivers innovation to aid and satisfy its customers. HM Cragg was founded in 1968 and is 100% employee-owned, focusing on quality people and exceptional products.

Products Sold:

- AC and DC power solutions (UPSes, power distribution)
- Control and monitoring (environmental and power)
- Connectors and cables (cord sets, ePDU cables)
- Cooling (air flow management, portable cooling)
- Racks and enclosures (standard racks, battery racks)
- Safety equipment (spill containment, safety signs)

(800) 672-7244 | www.hmcragg.com

PHYSICAL INFRASTRUCTURE



The Mestex division of Mestek is comprised of seven company brand names: Applied Air, LJ Wing, Aztec, Alton, Temprite, Koldwave, and Sierra. Mestex is involved in emerging technology and product research focused on using energy and water more efficiently, including ways to improve data center efficiency by using outside air, evaporative cooling, and optimized DDC control schemes.

Products Sold:

- Mechanical and evaporative cooling products
- Heating products
- Outside air tempering products
- Packaged evaporative cooling solutions for mission-critical applications

(214) 819-5262 | www.mestex.com

PHYSICAL INFRASTRUCTURE



Server Technology is committed to the PDU market with the largest group of engineers dedicated to power distribution and other solutions within the equipment cabinet. Advancements in device power monitoring help data centers monitor and improve their efficiency, and continuous research and development is fueled by companies that look to Server Technology for their custom cabinet power solutions.

Products Sold:

A complete line of cabinet PDUs, including Per Outlet Power Sensing (POPS), Rack Mount Fail-Safe Transfer Switch, Console Port access with remote power management, Switched, Smart, Metered, Basic, and -48 VDC

(800) 835-1515 | www.servertech.com

PHYSICAL INFRASTRUCTURE



PDUsDirect.com is a Master Distributor of select Server Technology PDUs for server and networked environments. PDUs Direct's basic, metered, and switched Rack PDUs provide local and remote power management, power monitoring, and environmental monitoring. We pride ourselves in offering industrial-grade quality products at the lowest prices, with the fastest shipping (most orders shipped within 24 hours) and simplest purchase process. We are the Power Behind the Business.

Products Sold:

A complete line of metered and basic PDUs, and 20A switched PDUs.

(888) 751-7387 | pdusdirect.com

PHYSICAL INFRASTRUCTURE



BayTech was founded in 1976 and, since the 1990s, has developed unique products for remote power management. The company uses printed circuit board instead of wires for a better, more resilient connection between the data center equipment and the receptacle. BayTech provides an extensive Web site with brochure downloads, warranty information, and reseller support and also offers evaluation units for data centers.

Products Sold:

- Power control, distribution, management, and metering
- Power transfer switches
- Console management and remote site management

(800) 523-2702 | www.baytech.net

PHYSICAL INFRASTRUCTURE



Since 1985, Spot Coolers has specialized in portable cooling and heating units for use in data centers, commercial office buildings, hospitals, schools, factories, and warehouses. As a United Technologies Company, Spot Coolers takes Responsibility for Ethics, Safety, Security and Protecting the Environment. With more than 5,000 portable cooling and heating units at our 38 locations nationwide, you can be sure that our delivery and installation staff are reliable and dependable: people you can trust!

Rentals & Sales of:

- Air-cooled and water-cooled air conditioning units
- Heat pumps
- Ceiling-mounted cooling units
- Trailer-mounted cooling units

800.367.8675 | www.spot-coolers.com

PHYSICAL INFRASTRUCTURE



Black Box is a leading technology product solutions provider that helps customers build, manage, optimize, and secure their networks. The company is a single source for cabling, cabinets and racks, localized cooling, power and surge protection, environmental monitoring, and more. Black Box also offers a best-price guarantee and FREE, live, 24/7 U.S.-based Tech Support.

Products Sold:

- | | |
|--------------------------|---------------------------|
| • Acoustic IT Enclosures | • Industrial |
| • Cabinets & Racks | • Infrastructure Hardware |
| • Cables & Patch Panels | • KVM |
| • Console Servers | • Networking |
| • Cooling | • Power |
| • Datacom | • Remote Monitoring |

(877) 877-2269 | www.blackbox.com

PHYSICAL INFRASTRUCTURE



Sensaphone has been designing and manufacturing remote monitoring systems for more than 25 years and has more than 300,000 of its products in use. Sensaphone's product lineup offers a full range of devices with a broad number of features and applications designed to monitor your entire infrastructure and alert you to changes. All product engineering functions, including hardware and software design and circuit board layout and assembly, are performed at the Sensaphone facility in Aston, Penn.

Products Sold:

Remote monitoring solutions that provide email and voice alarm notification for problems related to temperature, humidity, water detection, power failure, and more.

(877) 373-2700 | www.sensaphone.com

PHYSICAL INFRASTRUCTURE




PDU Cables is the leading supplier of power distribution cables assemblies to data centers in North America. PDU Cables has been serving this industry since 1981 and is the first independent cable assembly company to introduce colored conduit into the power distribution cable market, the first to get UL 478 listing, and the first to introduce the Power Cable and Equipment Configurator software tool. The company is centrally located in Minneapolis, Minn., allowing it to offer 24-hour turnaround and shipping time of just one or two days to almost any United States destination.

Products Sold:

A range of power cables, cable seals, and power cord assemblies.

(866) 631-4238 | www.pducables.com

PHYSICAL INFRASTRUCTURE



Temperature@lert is a leading provider of low-cost, high-performance temperature monitoring products designed to provide early warning of temperature changes before it's too late. The company's goal is to deliver products that can eliminate your worries about system malfunctions or product damage due to temperatures. The Boston, Mass.,-based company has sold more than 10,000 products to customers in 40 countries.

Products Sold:

A full line of temperature monitoring products, including the Temperature@lert USB Edition, WiFi Edition, and Cellular Edition

(866) 524-3540 | www.temperaturealert.com

PHYSICAL INFRASTRUCTURE



Headquartered in Connecticut, Siemon has been around since 1903 as a provider of high-quality cabling solutions designed to improve network connections, performance, and efficiency. The company manufactures end-to-end copper and fiber cabling systems, cabinets, racks and cable management solutions for data centers, and more. Siemon also has an R&D arm, Siemon Labs, which focuses heavily on innovation and shows the company's long-term commitment to its customers.

Products Sold:

- Cable management solutions
- Data center cabinets and racks
- End-to-end copper and fiber cabling
- High-speed interconnects
- Intelligent infrastructure management

(860) 945-4200 | www.siemon.com

NETWORKING & VPN



Metric Systems Corporation® designs and manufactures broadband wireless networking equipment, and end-to-end solutions for government and industry. We've been in the business of manufacturing and integrating reliable industrial-grade wireless networking systems for over 25 years. Our networks are deployed around the world protecting and supporting people and machines. Our specialty is working with your unique requirements and existing infrastructure to provide a networking solution that fits your requirements, schedule, and budget.

Products Sold:

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(800) 549-7421 | www.metricssystem.com

SERVERS




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Products Sold:

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- GPU servers
- Motherboards
- Storage solutions
- Embedded
- Chassis
- Blade servers

(408) 503-8000 | www.supermicro.com

SERVERS




Chenbro is a leader in enclosure solutions, selling its products primarily to system integrators and OEM and channel partners. The company's extensive research and development efforts help it to keep its competitive edge and maintain market leadership, with special focus on thermal, EMI, and acoustic solutions. Taiwan-based Chenbro has offices in the United States, UK, The Netherlands, and China.

Products Sold:

- A comprehensive line of PC chassis, server/workstation chassis, rackmount chassis, and HDD enclosures.

(909) 947-3200 | www.chenbro.com

CLIENTS



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- Web with Spider
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SERVICES



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SERVICES



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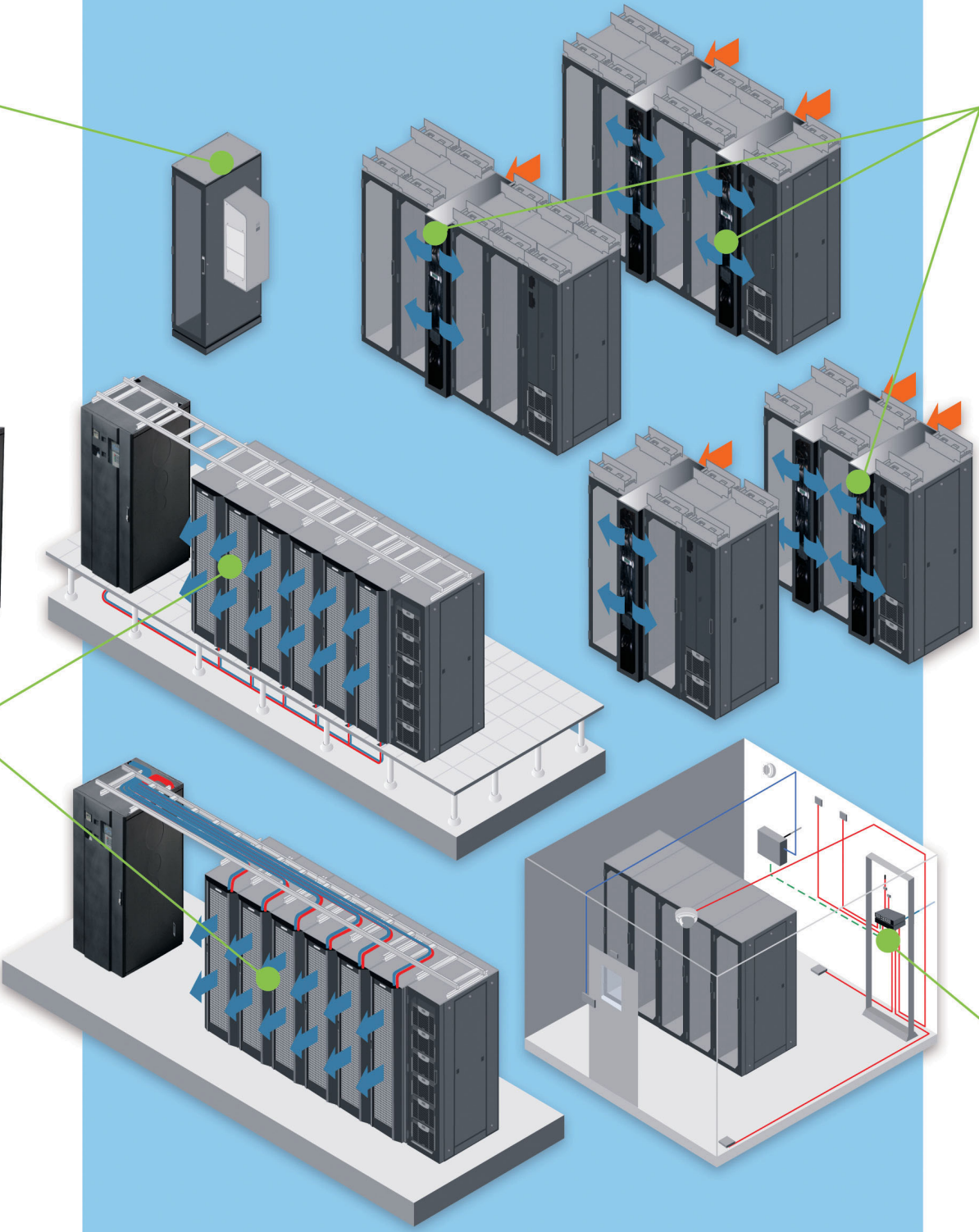
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